A PROSPECTIVE OPEN LABELLED NON RANDOMIZED PHASE-II CLINICAL TRIAL TO ASSESS THE THERAPEUTIC EFFICACY OF THE SIDDHA FORMULATION "*VELLARUGU CHOORANAM*" FOR THE TREATMENT OF

"*ERI GUNMAM*"

(PEPTIC ULCER DISEASES)

Dissertation submitted to

THE TAMILNADU DR. M.G.R. MEDICAL UNIVERSITY, CHENNAI-32

For the partial fulfillment of the

requirement for the degree of

DOCTOR OF MEDICINE (SIDDHA)

(Branch-I Pothu Maruthuvam)

DEPARTMENT OF POTHU MARUTHUVAM

GOVERNMENT SIDDHA MEDICAL COLLEGE & HOSPITAL

PALAYAMKOTTAI - 627 002

OCTOBER 2019

GOVERNMENT SIDDHA MEDICAL COLLEGE & HOSPITAL

PALAYAMKOTTAI, TIRUNELVELI - 627 002,

TAMIL NADU, INDIA.

Ph: 0462-2572736/2572737 Fax: 0462 – 2582010

gsmc.palayamkottai@gmail.com

BONAFIDE CERTIFICATE

This is to certify that the dissertation entitled **A prospective open labelled non randomized phase II clinical trial to assess the therapeutic efficacy of the Siddha formulation *Vellarugu chooranam* for the treatment of *Erigunmam* (Peptic Ulcer Disease)** is bonafide work done by **Dr.M.MUTHUMARI (Reg.No.321611005)** Govt. Siddha Medical College, Palayamkottai in partial fulfillment of the University rules and regulations for award for **MD (S), BRANCH-I POTHU MARUTHUVAM** under my guidance and supervision during the academic year **OCTOBER 2016-2019.**

Name and Signature of the Guide
Dr. T.KOMALAVALLI, MD (S), Ph.D.,
Associate Professor,
Department of Pothu Maruthuvam ,
Govt. Siddha Medical College & Hospital,
Palayamkottai.

Name and signature of the HOD
Prof. Dr. A.MANOHARAN, MD (S), (Ph.D),
HOD, Dept. of Pothu Maruthuvam,,
Govt. Siddha Medical College & Hospital,
Palayamkottai.

Name and signature of the Principal
Prof. Dr.S.VICTORIA, M.D(S),
Govt.Siddha Medical College & Hospital,
Palayamkottai.

CERTIFICATE-I

Certified that I have gone through the dissertation entitled **A prospective open labelled non randomized phase II clinical trial to assess the therapeutic efficacy of the Siddha formulation *Vellarugu chooranam* for the treatment of *Erigunmam* (Peptic Ulcer Disease)** submitted by **Dr.M.MUTHUMARI (Reg. No.321611005)** a student of final year **MD(S), Branch-I,** Department of Pothu Maruthuvam of this college and the dissertation work has been carried out by the individual only. This dissertation does not represent or reproduce the dissertations submitted and approved earlier.

Head of the Department,
P.G Pothu Maruthuvam (Branch-I)
Govt. Siddha Medical College & Hospital,
Palayamkottai.

CERTIFICATE II

This is to certify that this dissertation work entitled **A prospective open labelled non randomized phase II clinical trial to assess the therapeutic efficacy of the Siddha formulation *Vellarugu chooranam* for the treatment of *Erigunmam* (Peptic Ulcer Disease)** of the candidate **Dr.M.MUTHUMARI** with registration Number **321611005** for the award of **M.D (Siddha)** in the branch of Pothu Maruthuvam. I personally verified the urkund.com website for the purpose of plagiarism check. I found that the uploaded thesis file contains from introduction to conclusion pages and result shows 10 percentage of plagiarism in the dissertation.

Supervisor sign with seal

DECLARATION

I declare that the dissertation entitled **A prospective open labelled non randomized phase II clinical trial to assess the therapeutic efficacy of the Siddha formulation *Vellarugu chooranam* for the treatment of *Erigunmam* (Peptic Ulcer Disease)** submitted for the degree of MD Siddha Medicine in Government Siddha Medical College, Palayamkottai, Tirunelveli, Tamil Nadu (The Tamil Nadu Dr. M.G.R. Medical University, Chennai) the record of work carried out by me under the supervision of **Prof.Dr.A.Manoharan,MD (S), (Ph.D**), Head of the department, Department of Pothu Maruthuvam, and guided by **Dr.T.Komalavalli, M.D(S), Ph.D.,** Associate Professor, Govt. Siddha Medical College, Palayamkottai. This work has not formed the basis of award of any degree, diploma, associateship, fellowship or other titles in the university or any other university or institution of higher learning.

Signature of the candidate

(Dr.M.MUTHUMARI)

Place : Palayamkottai

Date :

ACKNOWLEDGEMENT

First of all I thank my Almighty God for his showered blessings upon me in performing my dissertation works. I express my gratitude to **Vice-Chancellor, the Tamil Nadu Dr. M.G.R. Medical University,** Chennai and **Special Commissioner, Commissionerate of Indian Medicine and Homeopathy,** Chennai for granting me to undertake this dissertation work.

My sincere thanks to **Prof. Dr.S.Victoria,M.D(S),** Principal, Govt. Siddha Medical College, Palayamkottai for permitting me to use all the facilities available in this institution.

I extend my sincere thanks to Former Principal **Prof.Dr.R.Neelavathi, MD(S),Ph.D,** Govt. Siddha Medical College, Palayamkottai for approval and support provided as the for runner of the study.

I also wish to express my sincere gratitude to my supervisor **Prof.Dr.A.Manoharan,MD(S),(Ph.D)** Head Department of Pothu Maruthuvam,Government Siddha Medical College, Palayamkottai, Tirunelveli for his encouragement, patience, guidance and his excellent supervision during my stay at the Department.

I express my deep gratitude to my guide **Dr. T.Komalavalli, MD (S), Ph.D.,** Associate Professor, Department of Pothu Maruthuvam for her devoted guidance in my dissertation work.

I would take this moment to signify my sincere gratitude to **Dr.Thomas M Walter,MD(S),**Associate Professor, **Dr. S.Justus Antony, MD(S), Dr. G.Subash Chandran, MD (S), Ph.D., Dr. S.Uma Kalyani, MD (S), Dr. P.Sathish Kumar, MD (S),** Lecturers, Post Graduate, Department of Pothu Maruthuvam for their valuable suggestions for my dissertation work.

I express my thanks to **Dr.S.Sutha, M.Sc., Ph.D.,** Associate Professor in Department of Medicinal Botany, Govt. Siddha Medical College, Palayamkottai for her suggestions in the botanical aspect of my work.

I thank **Prof.N.Naga prema, M.Sc., M.Phil.,** and other technical staffs, Department of Biochemistry for helping me in elicting biochemical analysis.

I express my thanks to **Mrs. T.Poonkodi, M.A., M.L.I.S.,** Librarian, Govt. Siddha Medical College, Palayamkottai for permitting me to utilize the college library.

I express my thanks **Dr.N.Chidambaranathan, M.Pharm, Ph.D,** Vice principal,K.M.College of Pharmacy,Madura**i** who helped me in carrying out the pharmacological and toxicological analysis of the clinical trial medicine. Also, I express my thanks Inbiotics (Affiliated to Institute of Biology and clinical research) Nagercoil, helped me in carrying out the Anti-microbial Study of the trial medicine.

CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

OPD	- Out Patient Department
IPD	- In Patient Department
TC	- Total Count
DC	- Differential Count
ESR	- Erythrocyte Sedimentation Rate
Hb	- Hemoglobin
P	- Polymorphs
L	- Lymphocytes
E	- Eosinophils
PUD	- Peptic Ulcer Diseases
IEC	- Institutional Ethics Committee
IAEC	- Institute Animal Ethics Committee
CTRI	- Clinical Trial Registry of India
ICMR	- Indian Council of Medical Research
SPSS	- Statistical Package for the Social Sciences
Ach	- Acetylcholine
SEM	- Standard error of the mean
ANOVA	- Analysis of Variance
CAS	- Clinical Assessment Score
VC	- *Vellarugu Chooranam*

ABSTRACT

Life style disorders have been a major factor affecting all wake of the society, one among is Peptic ulcer disease (*Eri Gunmam*). Various classical medicines of herbal, herbo-mineral and mineral orgins were prescribed by Siddhars for tackling the *Eri Gunmam*. So I have selected *Vellarugu chooranam (Gunapaadam mooligaim mudhal vagupu*-Page.no:843) for *Eri Gunmam*. *Eri Gunmam* is a specific gastro intestinal disorder mentioned in the *Yugi Vaidhya Chinthamani*. The signs and the symptoms of *Erigunmam* more or less resemble with that of symptoms in Peptic Ulcer Disease (PUD) of modern medicine. This study was planned to document the efficacy of my trial drug in the management of *Eri gunmam*. 40 patients with Clinical Assessment Score (Grade $\geq$ 2) were recruited for the study and treated with *Vellarugu chooranam* (30mg/kg/bw) for 30 days. The face to face questionnaire was administered at the time of enrolment. The study shows the prevalence is higher in patients of Males (62.5%), *Pitha Kaalam* (34-66 yrs, 75%), *Pitha Vaatha Naadi* (57.5%) etc. After the trial, the majority of the cases showed Clinicaly Cured & well improvements based on clinical Assessment Score (Grade $\geq$ 2, 85%). The preclinical studies such as biochemical studies, pharmacological studies add an account for the anti ulcer activity. All the relevant results were statistically analysed. The study showed the clinical efficacy (Grade, p value<0.0001) of *Vellarugu Chooranam* is clinically significant.

CHAPTER - I

INTRODUCTION

1.1 BACKGROUND

The Siddha system of medicine is one of the native systems of south India which was propound and practiced by well-known spiritual scientists called Siddhars. Siddhars were the greatest scientists of ancient times. They were men of high culture, intellectual and spiritual faculties combined with super natural powers.The Agasthiyar is considered as the father figure in siddha medical science. In siddha system, health is a balanced state between body and mind,

"மனமது செம்மையானால் மந்திரஞ் செபிக்க வேண்டா
மனமது செம்மையானால் வாயுவை உயர்த்த வேண்டா
மனமது செம்மையானால் வாசியை நிறுத்த வேண்டா
மனமது செம்மையானால் மந்திரஞ் செம்மையாமே"

மனம் தூய்மையானால் அது ஒன்றே போதுமானது. வேறு எதுவும் முக்கியமல்ல.

- **அகத்தியர் ஞானப்பாடல்.**

As per siddha literature human physiology is based on 96 *Thathuvas* and *Ezhu Udarkattukal* which includes humours and boothas. The goal of siddha system is prevent ailments of body & mind, heal the sick and to provide healthy life. Prevention and cure are the basic aim of all systems of medicine whereas the siddha system has in addition the transcendental motivation. The basic emphasis of siddha system is based on positive health, viz, by careful dieting and proper relaxation of the mind to achieve a totality of health that assures not only longevity but also immortality. The same is expressed by Thirumoolar in Thirumathiram as,

"மறுப்ப துடல் நோய் மருந்தெனலாகும்
மறுப்ப துளநோய் மருந்தெனச் சாலும்
மறுப்ப தினி நோய் வராதிருக்க
மறுப்பது சாவையும் மருந்தென லாமே"

In siddha system of medicine the close relation is maintained between Man and Prapancham (UNIVERSE). Whatever changes occurs in the prapancham influences the human body also. The basic elements of the universe namely, Earth (nilam), Water (neer), Fire (thee), Air (katru) and Ether (agayam).

In Tridhosa (or) three humours, when any of the thodam's accumulates in the body, the body loses its balance. The factors, which affect the equilibrium of three humours, are environment, climatic condition, diet and physical activities.

According to **Agathiyar vaithiya rathina surukkam** the diseases were classified into **4448** that are commonly attacking our body. Classification was made on the basis of pancha bootham and tridhosa theory.In Yugi Vaithiya Chinthamani 800, among the eight types of *GUNMAM*; I had selected *ERIGUNMAM* for this study. The signs and symptoms mentioned in the classical book closely resembles with that of Peptic Ulcer Disease in modern medicine. So, I had selected the medicine *VELLARUGU CHOORANAM* for the management of *ERIGUNMAM*.

1.2 AIM AND OBJECTIVE

1.2.1 AIM

To evaluate the clinical efficacy of Siddha medicine ***Vellarugu Chooranam*** (Internal medicine) in the management of ***Eri Gunman*** (Peptic ulcer disease).

1.2.2 PRIMARY OBJECTIVE

To document the therapeutic efficacy of ***Vellarugu Chooranam*** (Internal medicine) in the treatment of ***Eri Gunmam*** (Peptic ulcer disease).

1.2.3 SECONDARY OBJECTIVE

1. To study about the
    i. Siddha diagnostic parameters
    ii. Habits of voluntary control of Reflexes(14 vegangal), Udarthee, Thegi Ilakkanam, Gunam, Manikadainool in Erigunmam
    iii. To evaluate the clinical symptoms before and after treatment to rule out the efficacy of *Vellarugu Chooranam*
2. To study about the
    i. Uyirthathukkal properties in Eri Gunman
3. To evaluate the
    i. Biochemical,
    ii. Phyto-chemical,
    iii. Anti-Microbial
4. To screen the Pharmacological activities of *Vellarugu Chooranam*.
5. To evaluate the acute and sub acute toxicity of *Vellarugu Chooranam.*
6. To do Difference analysis with SPSS for,
    i. Evaluating the clinical efficacy of *Vellarugu Chooranam* using clinical assessment score.

CHAPTER - II

REVIEW OF LITERATURE

2.1 GUNAPADAM ASPECT

VELLARUGU

BOTANICAL NAME : ***Enicostemma axillare lam***

NAMES

Tamil	: Vellarugu, Vallari
English	: Indian white head
Hindi	: Chota chirayata
Telugu	: Chevvu kurti
Bengali	: Nagajiva
Gujarathi	: Mamijiva
Malayalam	: Vellaruku, Vallari
Marathi	: Kadavinayi

PART USED : **whole plant**

PROPERTIES

Suvai (Taste)	: Kaippu
Thanmai	: (Nature) Veppam
Pirivu (Bio- Transformation)	: Kaarppu

ACTIONS

1. Stomachic
2. Tonic
3. Laxative
4. Alternative
5. Febrifuge

2.1.1 Ingredients and Medicinal uses of *Vellarugu Chooranam*

TAMIL NAME	PHARMACOLOGICAL ACTIONS	THERAPEUTIC USES IN SIDDHA
Vellarugu	Anti-ulcer, Anti-spasmodic, anti-inflammatory, Anti microbial, Anti oxidant, Analgesic.	Gunmam, Vali Noi, Kudal vadham, Soolai, Ulluru Kiranthi, Dhinavu, Sirangu.

***(Gunapadam Mooligai Muthal Pagam*Page No.843)**

Synonyms **: *Enicostemma littorale blume***

: *Enicostemma hyssopifolium verdon*

2.2 IN JOURNAL

Taxonomy

Kingdom : Plantae
Subdivision : Angiospermae
Class : Dicotyledonae
Subclass : Gamapetalae
Series : Bicarpellatae
Order : Gentianales
Family : Gentianacae
Genus : Enicostemma
Species : axillare

Geographical distribution

This tropical genus is widely distributed in India, South America, Africa, and Asia. E. axillare grows in many diverse habitats from savannas, grasslands, forests to beaches, from wet to very dry and also survives in a very saline environment (Rajamani et. Al 2013).

Morphology

Enicostemma axillare is an erect, perennial herb, 5-30 cm tall, simple or branched at the base. Stem is cylindrical, glabrous with a decurrently ridge below each leaf. Leaves are sessile sometimes narrowed into a petiole-like base, longer than the internodes; lamina (5.0-8.0-0.3-1.0) cm, linear to lanceolate or narrowly oblong, entire, obtuse and marinate at the apex, somewhat narrowing towards the base, 3-nerved from the base, glabrous. Inflorescence in many flowered auxiliary clusters, numerous in the axils of each pair of leaves. Flowers are white with green lines, drying yellowish, sessile or sub sessile; bracts long, shorter than the calyx, lanceolate-acuminate, carinate. Calyx tube 1-2 mm long; lobes usually unequal, (0.7-1.5- 0.4-0.7) mm, triangular to lanceolate, acute at the apex and narrowly scarious at the margin, or obviate to sub circular, obtuse and marinate at the apex, with wide scarious margin. Corolla tube is 3.5-6.0 mm long; lobes (1.5-2.0-0.7-1.0) mm, ovate and abruptly narrowing to an acute or mucronate apex. Stamens inserted below the sinuses, just above the middle of the tube; filaments 1.5-2.3 mm long, with a double hood at the insertion point (Rajamani et. Al 2013).

Chemical compounds

This plant comprises of different chemical compounds. Many compounds have been isolated from the plant, *E. littorale*. Tanna *et al.* reported that the aerial part of the plant gave 34% of dry alcoholic extract and 15.7% of ash. ***The presence of minerals like iron, potassium, sodium, calcium, magnesium, silica, phosphate***, chloride, sulphate and carbonate were estimated in the qualitative analysis of ash. Natarajan and Prasad reported the presence of five alkaloids, two sterols and volatile oil. Betulin, a triterpene sapogenin was also isolated by earlier workers. Monoterpene alkaloids like enicoflavin, gentiocrucine and seven different flavonoids were isolated from the alcoholic extract and the structures were identified as apigenin, genkwanin, isovitexin, swertisin, saponarin, 5-o glucosylswertisin and 5-o glucosylisoswertisin were also isolated by Goshal *et al*. The presence of catechins, saponins, steroids, sapogenin, triterpenoids, flavonoids and xanthenes and new flavones C-glycoside named as Verticilliside was isolated for the first time this species was reported by Jahan *et al*. Swertiamarin compound was isolated from *E. littorale* by using alcoholic extract. Six phenolic acids like vanillic acid, syringic acid, p-hydroxy benzoic acid, protocatechuic acid, p-coumaric acid and ferulic acid were also found by Desai *et al*.

Methanol extract of *E. littorale* was found to be containing different amino acids like L-glutamic acid, tryptophan, alanine, serine, aspartic acid, L-proline, L-tyrosine, threonine, phenyl alanine, L-histidine monohydrochloride, methionine, iso leucine, L-arginine monohydrochloride, DOPA, L-Glycine, 2-amino butyric acid and valine. Swertiamarin is a representative constituent of many crude drugs, which are marketed in Japan and other countries and these crude drugs are normally evaluated by their high swertiamarin content (Rajamani et. Al 2013).

2.2.1 Phamacological Screening

Antiulcer and anti-inflammatory activity

Roy et al. 2010 study showed the aerial parts of E. littorale against aspirin, ethanol and pyloric ligation induced ulcers in rats and bovine serum albumin (BSA) denaturation were examined for antiulcer and anti-inflammatory effects. The extract was administered to the overnight fasted rats, one hour prior to aspirin or alcohol or pyloric ligation challenge. The ulcer index, tissue GSH levels and lipid peroxidation levels in all the models of ulcers and the volume of gastric secretion, acidity and pH were estimated in the pyloric ligation model of ulcers. Pre-treatment with the aqueous extract of E. littorale showed a dose-dependent decrease in the ulcer index against aspirin, ethanol challenge and pyloric ligation. The prior administration of the aqueous extract also reduces the total acidity, free acidity, volume of gastric secretion and elevated the gastric pH. In addition, it was also observed that the aqueous extract inhibits the serum albumin denaturation in a dose-dependent manner. It was reported that the methanolic extract of E. littorale possesses antiulcer activity. And its anti-inflammatory activity may be attributed

Anti-Oxidant Activity

A.Krishnaveni et al.2012 has studied & observed the following, Three successive extracts of the whole plant of *Enicostemm aaxillare* (*E.axillare*) were examined for *in vitro* Anti oxidant activity using eight different methods. All the three extracts have shown a significant and potent result than the standard one. ***Ethanolic extract showed higher values in ABTS+, DPPH, FRAP, SOS and NOS Radical Scavenging activity.Methanolic extract has shown higher values in TRAP assay***. Petroleum ether extract also has shown a significant result i.e., higher than the standard but lesser than the other two extracts. All the three extracts have shown

higher values in total phenol and flavanol content. Hence, this project paves the way to study the anti cancer, anti inflammatory and anti diabetic activities of *Enicostemma axillare*.

Anti-Inflammatory activity

G. Leelaprakash et al.2011 has done methanol extracts of Enicostemma axillare and found that it possess Anti-inflammatory properties. These activities may be due to the strong occurrence of polyphenolic compounds such as alkaloids, flavonoids, tannins, steroids, and phenols, The extract fractions serve as free radical inhibitors or scavenger or acting possibly as primary oxidants and inhibited the heat induced albumin denaturation, proteinase activity and stabilized the Red Blood Cells membrane. EAME also reduced the activity of lipoxygenase. Purification of each bioactive compound is necessary and this purified form of the compound can be used which may show increased activity. This study gives on idea that the compound of the plant Enicostemm aaxillare can be used as lead compound for designing a potent anti-inflammatory drug which can be used for treatment of various diseases such as cancer, neurological disorder, aging and inflammation.

Hypocholestrolemic and Antioxidant activity:

Vaijanathappa J et al .2001 studies show that**,** the plant consists of flavonoids and phenol compounds which exertcardiovascular benefits. The 85% Methanolic extract of plant *Enicostemmaaxillare* showed hypocholestrolemic effect in fructose induced hyperlipidemicanimals. ***The dose of Enicostemma axillare (150mg/kg) decreased thelevel of cholesterol, Triglycerides, LDL and VLDL and increased HDL level. The extract might be inhibitors of HMG CO A reductase by 3 fold.Due to rich source of vitamin C, vitamin E and tannins inhibits the formation of OX-LDL.***Hence this extract displays antioxidant activity by increasing activity of enzymatic antioxidant like GPX and catalase and nonenzymatic antioxidant like GSH. Hence ***Enicostemma axillare is rich source of phytoconstituent which are used as potent hypocholestrolemic and antioxidant agent in pharmaceutical industry***.

Antimicrobial and Antioxidant activity:

Sharada Deore L et.al 2008 has determined the Invitro antimicrobial activity (well diffusion method) of aqueous, hydroalcoholic, Methanolic, chloroform and ethyl

acetate extracts of leaves of *Enicostemma axillare* plant has been evaluated by using six bacterial species and some fungi such as ***Staphylococcus aureus, Bacillus subtillis,Proteus vulgaris, Escherichia coli, Pseudomonas aerogenosa***, ***Shigella sonni,Aspergillus niger and Candida albicans*** observed that chloroform, ethyl acetate and hydroalcoholic extract showed prominent antimicrobial activity with highest zone of inhibition against all microorganisms. Invitro antioxidant activity of each extract except ethyl acetate by Nitric oxide and DPPH method shows antioxidant activity following sequence: Methanol > Hydroalcohol > Aqueous > Chloroform.

Anti oxidant and Hepatoprotective Activity:

Jaishree et.al 2010 observed that, Swertiamarin isolated from *Enicostemma axillare* of successive ethyl acetate extract showed antioxidant and Hepatoprotective effect against Dgalactosamine induced acute liver damage in rats. The dose of Swertiamarin (100-200mg/kg BW) interaperitonially against D-galactosamine which induced liver injury is used. The dose caused significant restoration of all the altered biochemical parameters i.e. elevation of antioxidant enzymes catalase, superoxide dismutase and glutathione and decreased level of MDA in serum liver and kidney to become normal. ***The potent dose 100 and 200 mg/kg for 8 days showed Hepatoprotective activity due to Invitro antioxidant property.***

Anti edematogenic and Free Radical Scavenging Activity:

Vaijanathappa et.al2009 study showed that Swertiamarin from ethyl acetate extract shows antiedematogenic activity using Carrageenan-formalin and Histamine–induced Paw edema methods in rats. In this method, edema inhibition obtained after 5hr. Induction were 38.60%, 52.50% and 45.44% for 100mg/kg, 200mg/kg BW Swertiamarin. The 100mg/kg Diclofenac sodium used as standard. It also shows Invitro antioxidant activity using seven different methods. Out of which good activity observed in ABTS (2.83 µg/ml, IC50). Hydrogen peroxide methods (5.70 µg/ml, IC50) moderate activity in hydroxyl radical by deoxyribose (52.56 µg/ml, IC50) and lipid peroxidation methods (78.33 µg/ml, IC50). Hence total antioxidant capacity was found to be 4.51mM of ascorbic acid per gram of Swertiamarin.

In vitro anti-inflammatory activity.

G. Leelaprakash et.al 2011study showed that, Methanolic extract (ME) of whole plant *Enicostemma axillare* (EA) was evaluated for anti-inflammatory activity by albumin denaturation assay; proteinase inhibitory activity at different concentrations .Aspirin, Diclofenac and Indomethacin were used as standard drugs. The result shows EA ME at conc. range of 100-500 μg/ml significantly ($p<0.01$) protects the heat induced protein denaturation. At the concentration 400 and 500 μg/ml EA ME showed significant ($p<0.01$) inhibition of 42 and 53% of proteinase inhibitory action. At the concentration of 100 and 200 μg/ml did not show significant ($p>0.05$) activity. Heat induced haemolysis of erythrocyte was significantly ($p<0.05$) inhibited at conc.400 and 500 μg/ml. hypotonicity induced haemolysis and lipooxygenase activity were significantly ($p<0.01$) inhibited at concentration range 200,500 μg/ml and 400,500 μg/ml respectively. ***It is indicated Methanolic extract of Enicostemma axillare can be potential source of anti-inflammatory agent.***

Antinociceptive activity

According Jaishree etal2009, Swertiamarin is used to relive pain. Three different methods in mice, for invivo antinociceptive activity were carried. In the hot plate method a significant increase in latency period was observed at 100mg/kg and 200mg/kg/BW of Swertiamarin after 30 and 45 min.The percent protection observed after 45 min. was 109.42 (100mg/kg bw) 147.42(200mg/kg bw) and 157.14(standard Paracetamol). In second method increases in the tail withdrawal reflex was observed in which Swertiamarin give percent protection 150(100mg/kg) and 200 (200mg/kg). In third method, acetic acid induced writhing Swertiamarin at 200mg/kg BW showed potent and both peripheral and central antinociceptive activity than that of Paracetamol.

Anti epileptic activity

Shalini et.al 2012 study showed that, The aqueous and chloroform extract of *Enicostemma axillare* were nontoxic up to recommended dose 2000mg/kg body weight orally as per OECD guidelines. ***The antiepileptic activity by maxima electroshock (MES) and pentylenetetrazole (PTZ) induced seizures in albino wistar rats shows onset of myoclonic spasm and clonic convulsion were delayed in test groupof dose 200 and 400 mg/kg bw of aqueous and chloroform extract.***

Anticonvulsant activity observed against MES and PTZ animal models. The percent protection of chloroform extract 200mg and 400mg dose in MES 82.43%, 83.04%. Respectively in PTZ induced convulsion 200mg and 400mg85.52%,82.67% resp. which is better than Hydroalcoholic extract in MES induced 200mg(2.75%) and 400mg (70.93%) and PTZ induced 200mg (70.02%) and 400mg (71.58%) dose.

Antibacterial activity

Pavithraet.al 2010 study showed that, the organic solvent extract of enicostemma axillare by disk diffusion and broth dilution technique shows antibacterial activity against gram positive bacterial strains. Results revealed that *methanol extract of enicostemma axillare showed activity against B.subtilis and were not bactericidal at 100mg/ml (MBC).*

2.3 SIDDHA ASPECTS

2.3.1 Introduction

"அண்டத்தி லுள்ளதே பிண்டம்
பிண்டத்தி லுள்ளதே அண்டம்
அண்டமும் பிண்டமும் ஒன்றே
அறிந்துதான் பார்க்கும் போதே"

-சித்த மருத்துவாங்கச்சுருக்கம்

According to the siddha system, "Whatever seen in macrocosm, is to be present in the microcosm. Living & Non-living things in the world consists of five elements namely.Man, Neer, Thee, Vayu andAkayam.These five elements are the basics of the three humours namely Vatham (creative function), Pitham (protective function) and Kabam (destructive function)

வாதமாய் படைத்து பித்த வன்னியாய் காத்து சேட்ம சீதமாய் துடைத்து"

-தேரர் சேகரப்பா

அறிவு வடிவு என்றறியாத என்னை
அறிவு வடிவு என்றருள் செய்தான் நந்தி
அறிவு வடிவு என்றரு ளாலறிந்தே
அறிவு வடிவு என்றறிந்திருந் தேனே.

-திருமூலர்

From time immemorial, people tried their best to realize oneself (அறிவு-ஆன்மா) & get free from karma. Some of them realized, and came to known as *Siddhars (Siddh-static)*. During their achievement, they came across many obstacles such as environmental factor, ageing factor, diseases, death etc. To overcome these obstacles, they do research elaborately.

Their research results evolves as '*Siddha'*system with the unique features of a developed life style, which deals with morality of day [*naal ozhukkam*] and seasons [*kaala ozhukkam*]; Yogam[astanga yogam]; Kayakarpam [pothu karpam & sirappu karpam]; Astrology; Diseases under topics of aetiology , classification, treatment[medicine & surgery], preventive measures etc.

"மிகினும் குறையினும் நோய்செய்யும் நூலோர்
வளிமுதலா எண்ணிய மூன்று"

- திருக்குறள்

The ratio between these three humours is 1, 1/2, 1/4. Any imbalances can result in diseases. Diseases of GIT (Gastro intestinal tract) and related organs are described under the entity GUNMAM in our texts.

2.3.2 Definition- *GUNMAM*

Gunman is a gastro intestinal disorder characterized by gradual deterioration of physico-psychological health eventually leading to fatality. In this disease, patient feel food pain pattern leading to burning sensation, which is relieved by vomiting. A repetitive episode leads to malnourishment of the subject.In another concept; Gunmam can be explained as accumulation of vayu leading to rumbling beat in stomach causing severe discomfort of the stomach.

2.3.3 Etiology

Diseases are due to alteration in diet & activities.

"உணவாதிசெயல்களால் நோய் செய்யும்"

-பொது மருத்துவம்

1. Causes due to changes in activities
2. Causes due to altered food
3. Infective causes
4. Astrological causes

2.3.3.1 Causes due to changes in activities:-

1. Controlling the reflexes such as,
    - Abanavayu
    - Appetite
    - Thirst
    - Tears
    - Yawning
    - Fatigue
2. Excessive boredom, Resentment, sexual desire.
3. Abusing an expert (master), God, Father, mother, child, opposite sex.
4. Fate due to cruelty such as humiliating others etc.

(1)“வாதத்தை தடை செய்தாலோ
மார்புநோய் குன்ம வாயு”
“விழியினில் நீரடக்கில்….
…..வாதங் கூடில்……
…….குன்மம் பற்றிடுங்….”
“பேசிய களைப்ப டக்கில்
…..குன்மம்”

-சித்த மருத்துவாங்க சுருக்கம்

(2)“மையான மங்கையுடன் மார்க்கத்தாலும்…….
தையாள சண்டாள கோபத்தாலும்
சலிப்பாலும் குன்மம் வந்து தாக்கும் பாரே”

–யூகி வைத்திய சிந்தாமணி

(3)“பார்க்கவே குருநிந்தை பண்ணினோர்க்கும்
பால்கரை சிசுவை பட்டினிவைத் தோர்க்கும்
மார்கமாம் மாதாவை பிதாவை நிந்தை
வஞ்சனை தான் செய்தோர்க்கும் மடந்தைதனை
கார்க்கவே கற்பழித்த காமுகர்க்கும்
கருதியே சிவநிந்தை பண்ணினோர்க்கும்
ஆர்க்கே யட்டகுன்மம் மனுகு மென்று
அறன் சொல்ல தேவிசொன்னாளறிந்து பாரே”

–யூகி வைத்திய சிந்தாமணி

(4) ‘‘குன்மம் வந்த காரணந்தா னேதோவெனில்
குடிகெடுத்து வயிற்றெரிச்சல் கொண்ட பாவம்
நன்மையில்லா மனக்கவடு பெருத்த பாவம்
நல்லோரை மனம் நோக பழித்த பாவம்
தன்மையில்லா பிறர் பசிக்க உண்ட பாவம்
சண்டாள தத்துவமே செய்த பாவம்
இம்மையில் இப்பாவம் வந்து சுற்றி
அதனாலே குன்மமென வெகுத்த வாறே’’

–அகத்தியர் கன்ம காண்டம்

2.3.3.2 Causes due to altered food

1. Excessive intake of astringents, tubers, Pepper.
2. Intake of hot water before food.
3. Food adultered with fine stones, paddy, hair.

(1)‘‘செய்யான குன்மத்தினுற் பத்தி தன்னைச்
செப்பிடவே துவர்ப்பான புசிப்பினாலும்……
… உய்யான மிளகுவகை யுரைப்பினாலும்…..
…..வகையாக கிழங்குவகை யிருந்தாலும்’’

–யூகி வைத்திய சிந்தாமணி

(2)ஊனுக்கு முன் நீருண்டாற் பசிப்போம்
வீனுக்கு குன்மம் விளையும் காண’’

–பதார்த்தகுணசிந்தாமணி

(3)‘‘சுயமான குடலிலுள்ளே கல்லுமி நெல்லுமாமே
கல்லோடு மயிராயுள்ள கசடது குடலிற் பற்றி

–பரராசசேகரம்

2.3.3.3 Infective causes

Due to microorganisms,

வல்லுபாய் கதுவாய் அன்னம் செரியாத மாசினாலே
மெல்லிய கிருமி கொண்டு குன்ம நோய் மருவுங்கானே’’

–பரராசசேகரம்

2.3.3.4 Astrological causes

In Horoscope,

- The lord of 5th place is in weak stage(Neesam, Pagai, kiragayuththam, in 6th ,8th ,12th place),
- The most perishing Graham in Laknam (1st place),
- Sani Graham in 7th place.

"சொல்லிய ஐந்தினுக்கு இறைவர் துர்பலமே ஆகிதி
சொல்லு மதிபாலர் வதயம் சென்றிருக்க ஆளுமையோன்
வல்லுறுவே ரேம் பார்க்க வன்சன் ஏழிவில் நிற்க
கொல்லும் நமனைப் போலாகக் **குன்மம்** ரோகந் தோன்றும்"

–மணிமந்திர வைத்திய ரோகம்

2.3.4 Classification

Few more school of thoughts also explains classification of Gunmam:

S.no/ Author	Yugi Muniver	Thirukanda Munivar	Thirumoolar	Vada nool
1.	Vayu Gunmam or Payuru Gunmam	Vadha Gunmam	Vadha Gunmam	Vadha Gunmam
2.	Vatha Gunmam	Pitha Gunmam	PithaGunmam	PithaGunmam
3.	Pitha Gunmam	KaphaGunmam	Iya Gunmam	Iya Gunman
4.	Sethma Gunmam	Vatha Pitha Gunmam	MegaGunmam	Vatha Pitha Gunman
5.	*Eri Gunmam*	Vatha Kapha Gunmam		Vatha Kapha Gunman
6.	Vali Gunmam	Pitha Kapha Gunmam		Pitha Kapha Gunman
7.	Sathi Gunmam	Thrithoda Gunmam		Sanni Gunmam
8.	Sanni Gunmam	Raththa Gunmam		Raththa Gunmam

‘‘செய்யவே எண்குன்ம செயலைக் கேளாய்
செயலான வாயு குன்மம் வாத குன்மம்
எய்யவே பித்த குன்மம் எரிகுன்மமா கும்
ஏலான வலிகுன்ம சத்தி குன்ம
தையவே சன்னி குன்மஞ் சேட்ப குன்ம
சாகசமாங் குன்ம மெட்டு மாகும்
கொய்யவே யிதனுடைய குணங்களெல்லாம்
குறிப்பறிந்து ஒவ்வொன்றாய்கூர்ந்து பாரே’’

-யூகி வைத்திய சிந்தாமணி

‘‘என்றதில் வாதகுன்ம வலிகுன்மம் சக்தி குன்மம்
துன்றிய சூலகுன்மம் சொல்லுமி தசாத்தியந்தான்

கன்றிய பித்தகுன்மங் கபகுன்மங் குன்மசூரை
யொன்றெறி குன்மம் நான்கு முண்மையாய் தீருங்கானே’’

- தன்வந்திரி வைத்தியம்

‘‘தானான குன்மவகை எட்டுமிந்தத்
தரணியி லுண்டான விதத்தைக் கேளாய்
……..’’

- அகத்தியர் குணவாகடம்

“மல்லாரும் அட்ட குன்மம் ….’’

- பதார்த்த குண சிந்தாமணி

‘‘செப்பினோங் குனம் மெட்டுந் தெனிவே மானிடர்க்கு
ஒப்பிலா பல நூலாய்ந்து ஒழுங்குடன் பிணிகள் நீங்க’’

- ஆத்ம ரக்ஷாமிர்தம்

‘‘பண்ணிய வாதபித்தம் பகரைய குன்மமோடு
சன்னியே யெரிவு குன்மம் கனத்துடல் பிரட்டுங் குன்மம்
நன்னியே சத்தி குன்மம் நாடிடுஞ் சூலை குன்மம்
குன்னியே வலித்த குன்மம் குதித்தோட …’’

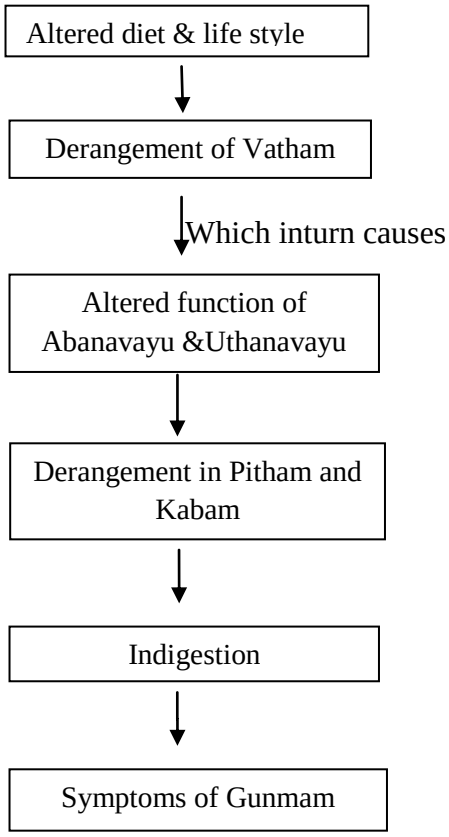
- அகஸ்தியர் மணக்கோலம்

2.3.5 Pathogenesis

"தொடர்வாத பந்த மலாது குன்மம் வராது"

-தேரன்

As per the aetiological aspects collected from various siddha literatures we conclude to know food habits and immoral behaviouralchanges can lead to increase of vatha humour in the pithasthanam namely stomach (mfL). Hence the equilibrium maintained among the three humours (Vatha, Pitha, and Kaba) was disturbed.



In the pathogenesis of Eri Gunmam, the changes in three humours play major role in the development of diseases which causes changes inudal thathukkal affects the udal vanmai and these pathological changescan be seen by the eight types of examination that is Envagai thervugal.

"பித்தமே கதித்தபோது பெருத்திடும் வாதமுண்டாம்
பித்தமே கதித்தபோது பெருத்திடும் வயிற்றில்வாயு
பித்தமே கதித்தபோது பெருத்திடும் பித்தேகேளு
பித்தமே கதித்தபோது பெருத்திடும் பிணியநேகம்"

- ரோக நிதான விலம்பகம் அகத்தியனார்

‘‘கூறிடவே பித்தமது சீறிற்றானாற்
கொடுங்காந்த லுடல்வறட்சி நடுக்குமுண்டாம்
மீறிடவே வரோசியந்தா னாவறட்சி
மேலான சோபமது விக்கல்மூர்ச்சை
தூறிடவே கிறுகிறுப்புக் காதடைப்புத்
தொந்தமாங் கசப்புடனே மண்டைக்குத்து
மாறிடவே நெஞ்செரிவு அக்கிமந்தம்
மகத்தான குளிர்சுரமுங் காய்தலாமே.’’

‘‘ஆமேதான் அஸ்திசுரம் பாண்டு சோகை
அழலான விடாச்சுரமும் பிரமேகந்தான்
போமேதான் காமாலை பித்த வெட்டை
பொல்லாத பாண்டுடனே சிவந்த நீராம்
தேமேதான் சிவப்பாயு மஞ்சளாயும்
சிறுசிறுத் திருண்டுவருங் குழிவிழுந்து
நாமேதான் சொன்னோமே பித்தக்கூறு
நவின்றிட்டார் வாசமுனி நவின்றிட்டாரே’’

- **சிகிச்சா ரத்ன தீபம்**

‘‘பகுத்திடிற் பித்தம் பலபல சிந்தையாம்
வகுத்திடும் வாந்தியும் வாய்நீர் மிகவூறும்
மகுத்திடு மேனியில் மாட்டி யெரிப்பேறும்
மிகுத்த வனிக்கு மிகவிடங் கைக்குமே’’

- **திருமூலநாயனார்**

‘‘தானான குன்ம வகை எட்டு மிந்த
தரணியிலுண்டான விதத்தைக் கேளாய்
ஊணான அசீரணத் தாலிந்த ரோகம்
உற்பத்தியாகு மென்றே உறுதி சொல்லு’’

- அகத்தியர் குணவாகடம்

‘‘ஏற்றிய குன்மு மெழுந்த விதங்கேள்
தோற்றிய பித்தமும் வாயுவும் தொந்திக்கில்
சேற்றி வன்னம் செரிக்கில் வலிப்பேறும்
மாற்றிய நீருதி வாந்தியுமாமே’’

–திருமூலர் கருக்கடை வைத்தியம்

2.3.6. Symptoms of Eri Gunmam

‘திடுக்குமா மெரிகுன்மச் செயலைக் கேளாய்
சிறுவயிற்றி லெரிந்துமே குடல் குமுறும்
வடுக்கும்வாய் நீர்சுரக்கும் தலைவலிக்கும்
வயிறுப்பிக் கிறுகிறுக் கும் பிளிந்தேக்காகும்
வெடிக்குமயிர்க் கால்தோறும் வியர்வை யாகும்
மிகப் பொருமி வயிறுகழிந் திரைச்சலாகும்
எடுக்குமே யுடலிளைக்கு மிரங்கா தன்னம்
எரியுமே யுடலெங்கு மிரும லாமே.’’

-யூகி வைத்திய சிந்தாமணி

மேவிய குன்மந்தான்னெழுந்ததோர் விதங்கள் சொல்வோம்
பாரிய பித்தத் தொடும் வாதமும் பரிந்து சேரில்
வாகிய வண்ண நீரும் வாந்தியமாகும் பாறே
பாரப்பா வாயு வாதம் பரிவுடனே பாவன்றங்கில்
ஏரப்பா நாடி தன்னை வரண்டுதான் மிகவே நோகும்
கோரப்பா நெஞ்சிற் குத்தும் குடலை முறுக்கிக் கொண்டு
வாரப்பா வலிக்கு மெத்த வாதமாய் வழங்கும் வாய்வே
வழங்கிய அப்புவோடு வாத மென்றேயால்
முழங்கிய முறுக்குமேனி திரையும் வதைக்குங்காலே’’

- அகஸ்தியர் வைத்திய காவியம்.

Descriptive features of *Eri Gunmam* among different literatures:

- Burning Pain
- Nausea
- Water brash
- Headache
- Flatulence
- Regurgitation
- Lack of food intake
- Dizziness
- Sweating
- Loss of body weight
- Neuritic pain
- Cough

“வயிற்றை யெரிக்குங் குடல் புரட்டி வாய்நீர் சுழற்றித்தலைகனமா
முயிர்ப்பை யழிக்கக் கிறுகிறுக்கு மோங்காரிக்கு மேப்பமுண்டா
மயிர்க்கால் வழியே வியர்வரும்பி வயிறு பொருமி யகன் றிடுகி
லியற்றி யெரிக்குங் குன்மமென யிமையோர் சொன்ன முறையாமே”.

- **தன்வந்தரி வைத்தியம்**

-

“வயிற்றை யெரித்திட்டுக்குடல்வாய்நீர்சுழற்றி த்தலைகனத்து
உயிர்ப்பையறியக ் கிறுகிறுக்கு மோக்காளித்து வேப்பமுண்டா
மயிர்க்கால ளவேவேர்வை வரும்வயிறுபொருமி யகன்றிடுதல்
லியற்றுட னெல்லாமெரிக்கு மெரிகுன்மத்தின் குணமிதுவே.”

- **ஆயுள் வேதம் 1200**

-

Erigunmam in Vaidhya Sara Sangraham

- வயிறு எப்போதும் இரையும்
- வயிறு பொருமும்
- குடலைப் புரட்டி ஒக்காளிக்கும்
- ஏப்பமிடும்
- தலைகனத்து வலிக்கும், கிறுகிறுக்கும்
- மயிர்க்கால் வழி வியர்க்கும்

Erigunmam in Sikicharathna Deepam

- வயிற்றில் எரிச்சல், வயிற்றுப்பிசம், வயிற்றிரைச்சல்
- குடல் புரட்டல்
- வாய்நீருதல், வாய்குமட்டல்
- புளியேப்பம்
- சரீரம் இளைத்தல், எரிச்சல்
- அன்னம் செல்லாமை
- இருமல்

Erigunmam in Seevarakchamirtham

- அடிவயிற்றில் எரிச்சல்
- குடல்குமட்டல்
- வாய்நீருறல்
- தலைசுழலல்

- வயிறுப்பல், இரைச்சல்
- புளியேப்பம்
- ரோமத்துளைகளில் வியர்வை பெருகல்
- பேதி
- சரீரம் இளைத்தல்
- அன்னம் செல்லாமை
- இருமல்.

The symptoms of Eri gunmam are also discussed in *Anubava Vaidhya Devaragasiyam and Sarabendrar Gunma Roga Sikitchai text book*.

Table 2.3.6 Symptomatology [Yugi]

Sl. No	Type of Gunmam	GIT	CNS	CVS	RS	Others
1.	Vatha Gunmam	Constipation, Loss of appetite, Dryness of the tongue	Sleepiness, Giddiness, Difficulty in walking, Paraesthesia, Headache, Burning sensation,	-	-	Pain all over the body, Restriction of walking, Heaviness of the body.
2.	Pitha Gunmam	Vomitting, Excessive thirst, Constipation	Paraesthesia, Giddiness	-	Cough, Breath lessness	Yellowish discolouration of the face, Fever, Burning Micturition
3.	Silethuma Gunmam	Ptylism, Loss of appetite	Haeviness of the head	Gross pallor	Dry cough	Emaciation, Fatiguability, Rigor, Stupor
4.	Sanni Gunmam	Loss of appetite,	Giddiness,unco nsciousness	-	Dry cough,	Rigor, Chillness

		Borborygmus, Ptylism, Diarrhoea, Burning sensation in the stomach, Salty taste in the tongue			Breath lessness	
5.	Eri Gunmam	Burning sensation in the Stomach, Ptylism, Flatutance, Belching, Diarrhoea, Nausea.	Headache, Giddiness, Perspiration	-	cough	Emaciation, Burning sensation all over the body
6.	Vayu Gunmam	Indigestion, Loss of appetite, Flatulence, Pain in lower Abdomen	Paraesthesia	-	-	Fatiguability, dryness of the body, Restriction of walking
7.	Saththi Gunmam -	Burning sensation in the upper abdomen, Constipation, Loss of taste, Increased Appetite	Giddiness, Unconscious ness	-	Cough	Fatiguability, Varicosity, Burning sensation, Restriction of walking

8.	Vali Gunmam	Flatulance, Borborygmus, Loss of appetite, Hypochondric pain radiating to back, False Appetite.	Disturbed sleep, Unconscious ness			Dryness of the skin, Body Pain, Back and hip Pain,Fever, Stupor

Uyir Thathukkal

Knowledge of three Uyir thathus and seven Udal Kattugal will be helpful to do detailed study on the disease.

Vatham

It is the life manifestation of Vayu and Ahaya boothams. Vatham located in the abanan, face, idakalai, spermatic cord, Pelvic bone, skin, nerves, joints, hairs and muscles

Functions of Vatham

Types of Vatham; It has 10 types;

1. Pranan (Uyir Kaal)

It is responsible for respiration and helps in **assimilation of foods intaken**.

2. Abanan (Keezhnokku Kaal)

It lies below the umbilicus and responsible for the downward by excreting the faecal matter and urine. **It gathers and carries the *anna saram* to the proper places**.

3. Viyanan (Paravu Kaal)

It is responsible for the action of all organs, sensation and it protects the body by **filling the essences of the digested food** in the proper places.

4. Uthanan (Melnokku Kaal)

It starts from *Udharaakkini* and travels with the essence of **digested food** and stops them in the proper places, it stirs and clear them.

5. Samanan (Nadu Kaal)

It controls all other vayus. It helps us **smoothening the food**, liquids and makes softening the six tastes and helps in spreading them in the body.

6. Nagan

It is responsible for the higher intellectual functions. It brightens the intellect to learn all the arts and sciences; it helps in opening and twinkling of the eyes.

7. Koorman:

It starts from the mind and makes the eyes to twinkle; it yawns; it gives strength; it helps in opening and closing of the eyes.

8. Kirukaran:

It dwells in the tongue and gives greasiness and moisture to the tongue and the nose. It **stimulates hunger**. It helps in remembering things, it helps in creating **sneezing** and **coughing**, which is responsible for taste sense.

9. Devathathan:

It starts like arch and causes laziness and to squeeze the body in laziness. Immediately after awakening from sleep, it gives languor. It is responsible for tolerance, temperament for fighting, argument and furty.

10. Thanajayan:

It escapes from the head on the third day after death.

Pitham

It is the life manifestation of the bootham. Its mathirai is ½.

Location of Pitham in the body

Pitham is located in Pingali Pirana Vayu, blood, Moolakini, heart, Umblicus, abdomen, Sweating, saliva, eyes and skin.

Functions of Pitham

Pitham controls digestion, temperature, vision, appetite, thirst, taste and strength of the body.It is responsible for the formation of red or yellow colour in the body and heat especially during digestion. It is also responsible for giddiness, increase of blood, discolouration of stools, urine, anger, memory and bitter and sour taste.

1. Anal Pitham

Its action is characteristic of thee. This is responsible for digestion of food.

2. Ranjaga Pitham

It is responsible for the colour and contents of the blood.

3. Saathagam

It lies in the heart. It is responsible for the action after thinking..

4. Prasagam

It is responsible for the complexion of skin.

5. Aalosagam

It is responsible for the vision.

Some patients affected causes defective vision.

Kabam

It is the life manifestation of Mann and Neer. It is mathirai's is ¼.

Location of Kabam

Kabam is located in Samana Vayu, Sperm, head, tongue, vulva, fat, bone marrow, blood, nose, chest, nerve, bone brain, eyes and joint and it provides the material for the structure of every cell of the body.

Functions of Kabam

Generally it acts as a destructive factor in the body. When Kabam is in normal condition, itmaintains heart function, taste, coolness of eyes, lubricates and aids free movements of the joints.

1. Avalambagam

It causes diseases of the respiratory system when it is affected thereby indirectly affecting the other Iyyams.

2. Kilethagam

Appetite and digestion may not be normal when it is affected.

3. Pothagam

It is present in the tongue and gives and taste..

4. Tharpagam

Memory and perception of senses may be affected when this is deranged.

5. Sandhigam

It is present in the joints and helps free movements.

Ezhu Udal Kattugal

There are seven primary body tissues which constitute the entire human body and all the organs of the various systems.

1. Saaram

It is the end product of digestive process. It gives strength to the body and mind.

2. Senneer

The saram after absorption is converted into seneer. It is responsible for knowledge, strength and health complexion.

3. Oon

It gives figure and shape to the body. It is responsible for the movement of the body.It lubricates the organs and thus facilitates their function.

5. Enbu

Gives shape to the body helps locomotion and protects vital organs.

6. Moolai / Machai

Present in the bone and it gives strength, maintains the normal condition of the bone.

7. Sukkilam / Suronitham

Responsible for reproduction.

Piniyari Muraimai

The method adopted to find out a disease in Siddha is known as PINIYARI MURAIMAI. It is based on the following principles.

- Poriyal Arithal
- Pulanaal Therthal
- Vinavuthal

"Pori" is the five organs of perception namely Nose, Tongue, Eyes, Ears and skin. "Pulan" is the five objects of senses smell. Taste, vision, auditory and sensation respectively corresponding to "Pori". Proiyalarithal and Pulanal Therthal go hand in hand with the concept to examining the patients "Pori" and "Pulan" with that of the "Patients. Pori and Physicians Pulan". "Vinathal" is a method of inquiring the details of either the patient's problem that made him to approach the physician from his own or his/her attenders who accompany them. The Primi method adapted to diagnostic the disease is by means of "Envagai Thervugal" (Eight types of investigation)

Envagai Thervugal Constitute:

1. Naa
2. Niram
3. Mozhi
4. Vizhi
5. Sparism
6. Malam
7. Moothiram
8. Naadi

1. Naa

The colour character and condition of the tongue change according to the changes of

Mukkutram.

2. Niram

Signs of Vatha, Pitha, Kaba, colours, mixed colour cyanosis, Pallor; flushing or yellowish discolouration can be studies by means of Niram.

3. Mozhi

Constitues high or low pitched voice, slurring and incoherent speech, nasal or crying & Hoarseness of voice etc.

4. Vizhi

Along with sight, anatomical lesions are noted. Burning of the eyes, lacrimation, irritation colour change of the eyes also noted.

5. Sparism

By palpation and inspection, the following informtion's were elicited. Temperature of the skin, whether uniformly hot or cold, thickness, fissures stuff / hard swelling, wrinkles, pigmentation of hairs etc.

6. Malam

Vatha Type: Hard, rough, dry, scanty and black

Pitha Type: loose stools with yellow colour, moderate in quantity

Kapha Type: gray or white coloured stools, huge in quantity with Slimy, mucus and Frothy bubbles.

7. Moothiram

Colour, quantity, froth, thickness, odour, frequency, retention or obstruction signs.

8. Naadi

Naadi is responsible for the existence of life can be felt one inch below the wrist on the radical side by means of palpation with the tips of index , middle and ring finger , Corresponding to vatham, pitham, Kabam. Three humors of vatham, pitham, kabam exists in the ratios 1:1/2:1/4 normally. Dearrangement in these ratios leads to various diseases entities

1. ‘‘வளிநாடி இடத்திலிசைந்தால் வளிகுன்மமாம்’’
   ‘‘பித்தநாடி இடத்திலிசைந்தால் பித்தகுன்மமாம்’’
   ‘‘கபநாடி இடத்திலிசைந்தால் கபகுன்மமாம்’’

   - பொது மருத்துவம்

2. ‘‘வாதந்தான் உதறிநிற்கில்
   வலிகுன்மம்வந்துசேரும்’’

   - பொது மருத்துவம்

3. ‘‘வாதமும்பித்தமும்கூடி
   வன்பெலத்துடனேயோடில்
   தீதறுவயிற்றுனுள்ளே
   திரண்டதோர்மந்தம்பற்றி
   வேதனையெரிப்புங்கூடி
   வெருண்டிடுமெரித்தகுன்மம்’’

   - பொது மருத்துவம்

4. ‘‘பித்தத்தால்பித்தகுன்மம்
   எரிகுன்மம்சத்திகுன்மமுண்டாகும்’’

   - பொது மருத்துவம்

5. ‘‘வாதமெனும்நாடியதுதொன்றில்
   சீதமந்தமொடுவயிறுப்பொருமல்திரட்சிவாயு
   ……
   நீதமுறுங்கிருமிகுன்மம் அண்டவாதம்’’

   - பொது மருத்துவம்

6. ‘‘சிறப்பானபித்தத்தில்வாதநாடி
   சேரிலுறுதாதுநட்டமுதரபீடை
   உரைப்பாகச்செரியாமைகுன்மசூலை’’

   - பொது மருத்துவம்

2.3.7. உணவுப்பழக்க வழக்கங்கள்

உணவில் சேர்க்க வேண்டியவை :

ஒரு வருடம் சென்ற சிகப்பரிசி சாப்பாடு, கற்கண்டு, மிருக மாமிச ரசம், பசும்பால், ஆட்டுப்பால், மோர், வெள்ளைப்பூண்டு, சுக்கு, பெருங்காயம், உஷ்ண, இலகு தீபண உணவுகள், திராட்சை, எலுமிச்சம் பழம், பேரீச்சம்பழம், மாதுளம்பழம், இளமுள்ளங்கி, முருங்கை, ஆமணக்கெண்ணெய்.

உணவில் தவிர்க்கவேண்டியவை :

உலர்ந்த மாமிசங்கள், மீன்கள், தித்திப்பான பண்டங்கள், புதிய தானியங்கள், முள்ளங்கி, வாயு சம்பந்தமான, மலபந்தகரமான அன்னங்கள்.

செய்ய வேண்டிய செயல்கள் :

- பசி நேர்ந்த நேரத்தில் அதனை உடனே தகுந்த உணவாதிகளால் தணிக்கவேண்டும்.
- அதிக பசி நேர்ந்த காலத்தில் நெய்ப்புப் பசை உள்ளதுமான உணவை உண்ண வேண்டும்.
    - காலை உணவு 7.30 – 8.30
    - மதிய உணவு 12.30 – 2.00
    - இரவு உணவு 7.00 – 8.00
- இரு மலங்களை கழித்த பின்னரே உணவருந்த வேண்டும்.
- மந்தத்தால் ஏற்படும் புளியேப்பம் இல்லாத நிலையில் உணவு உட்கொள்ள வேண்டும்.
- குளித்திருந்தாலும் மறுபடியும் முகம், கை கால்களை நன்றாய் தூய்மை செய்து கொண்ட பின்னரே உணவருந்த வேண்டும்.
- உண்ணும் போது உணவில் மனதை செலுத்தி வேறுவகையில் எண்ணத்தைப் செலுத்தாமல் உட்கொள்ள வேண்டும்.
- உணவுக்குப் பின் தகுந்தளவில் வெந்நீர் அருந்தவேண்டும்.

செய்யக்கூடாத செயல்கள் :

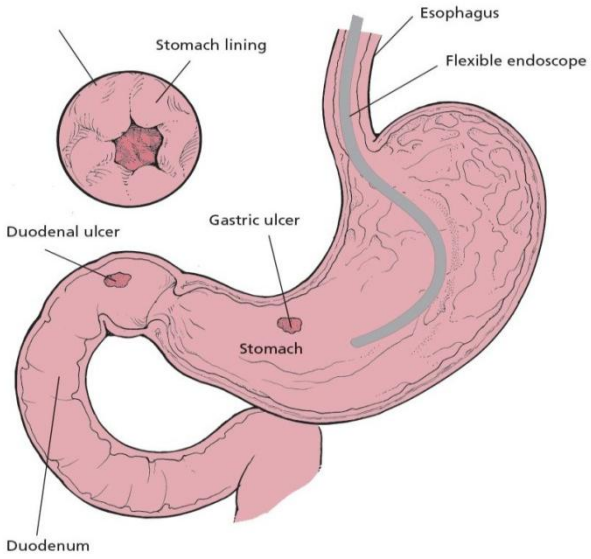
- உணவு உண்டவுடன் அதிக அளவில் நீர் அருந்த கூடாது.
- மலம், மூத்திரம், கண்ணீர் இவைகளை தடுத்தல் கூடாது.

2.4 MODERN ASPECTS

PEPTIC ULCER DISEASE

Peptic ulcers are the areas of degeneration and necrosis of gastrointestinal mucosa exposed to acid-peptic secretions mainly digestive action of gastric juice. Though they can occur at any level of the alimentary tract that is exposed to hydrochloric acid and pepsin, they occur most commonly (98- 99%) in either the duodenum (Duodenal ulcer) or the stomach (Gastric ulcer) in the ratio of 4:1. Each of the two main types may be acute or chronic.

Figure 2.4a: Peptic ulcer



Epidemology

The epidemiology of PUD in India may have changed in the past two decades with the incidence of duodenal ulcer declining more rapidly than that of gastric ulcer. By 2020, 4,50,000 people will be severely affected or die from its complications.Indian Council of Medical Research (ICMR) conducted Population Surveys and the Multicentric study on the prevalence of peptic ulcer. The lifetime prevalence of the peptic ulcer was 0.61% in Delhi, 0.69% in Chandigarh, and 0.75% in Chennai. The Point prevalence of peptic ulcer in India was 4.72% and the lifetime prevalence was 11-22%.

Gastric ulcer

Incidence

I. Less common than duodenal ulcers
II. Usually beyond 6thdecade
III. More common in males than in females(3.5:1)

Etiology

Gastric colonisation with H.pylori is usually asymptomatic but it leads to higher chances of development of duodenal ulcer. Disruption of mucus barrier is the most important factor.Association with gastritis, bile reflux, drugs, alcohol, tobacco will also leads to Gastric Ulcer.

Pathogenesis

The development of peptic ulcer depends on the interplay of the following injurious and protective factors.

Injurious factors

1. Endogenous -Acid, Pepsin, Bile acids

2. Exogenous -Ethanol, Aspirin, Other NSAIDs

Protective factors

Gastro mucosal barrier – Mucus

Cyto protection
a) Surface bicarbonate
b) Hydro phobic layer
c) Mucosal blood flow
d) Alkaline tide
e) Epithelial renewal
f) Restitution
g) Prostogladins
h) Epidermal growth factor

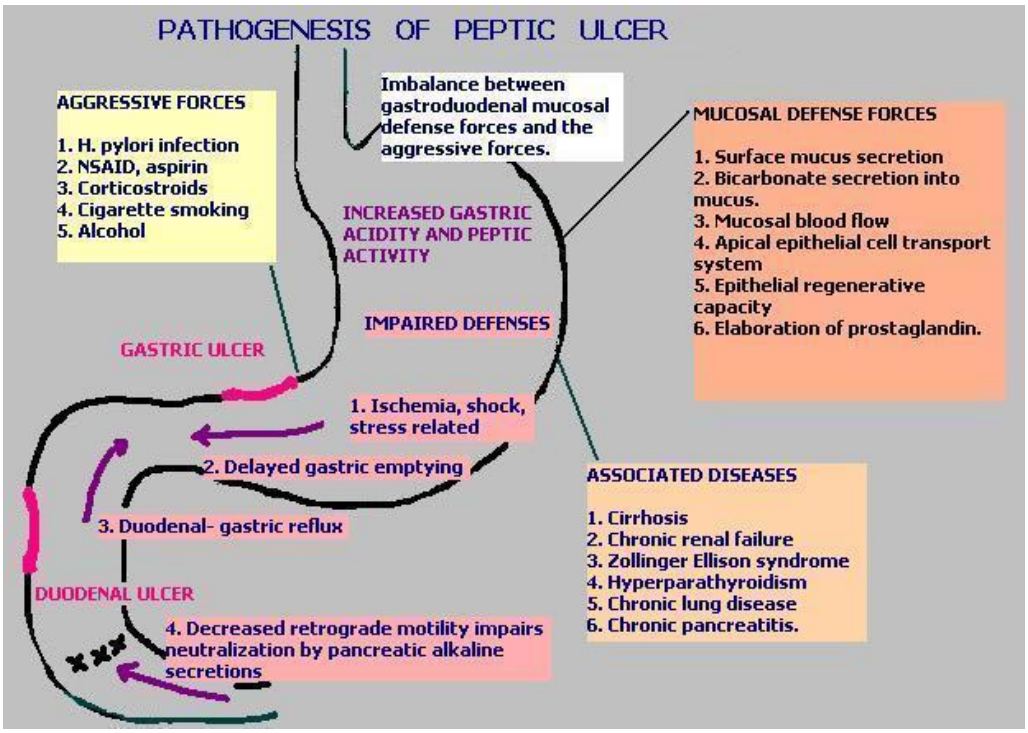
Pathologic Changes

a. Most common along the lesser curvature and pyloricantrum
b. Grossly similar to duodenalulcer
c. Histologically, indistinguishable from duodenalulcer

ClinicalFeatures

- Food-pain pattern
- No nightpain
- Vomiting common
- Haematemesis more common
- Significant loss of weight
- Patients choose bland diet devoid of fried foods, curries etc.
- Deep tenderness in the midline inepigastrium
- No seasonal variation
- More often in laboring groups

Figure 2.4b: Pathogenesis of Peptic Ulcer



Duodenal ulcer

Incidence

- ✓ Four times more common than gastric ulcers
- ✓ Usual age 25-50 years
- ✓ More common in males than in females(4:1)

Etiology

Most commonly as a result of H.pylori infection other factors hyper secretion of acid-pepsin, association with alcoholic cirrhosis, tobacco, hyperparathyroidism, chronic pancreatitis, blood group O, genetic factors.

Pathogenesis

- Mucosal digestion from hyperacidity most significant factor
- Protective gastric mucus barrier may bedamaged

Pathologic changes

Most common in the first part of duodenum often solitary, 1-2.5 cm in size, round to oval, punchedout. Histologically, composed of 4 layers – necrotic, superficial exudative, granulation tissue andcicatrisation

Clinical features

I. Pain food- relief pattern
II. Night pain common
III. No vomiting
IV. Malena more common than haematemesis
V. No loss of weight
VI. No particular choice of diet
VII. Deep tenderness in the right hypochondrium
VIII. Marked seasonal variation occurs more commonly in people at greater stress.

Endoscopic Differentiation between Benign and Malignant Ulcer

Signs of malignancy

- Presence of an ulcer within a definite mass
- Effaced, interrupted, fused or nodular mucosal folds as they approach margin of the crater.
- Irregular filling defects in the ulcer crater.
- Friability of ulcer and easy tendency to bleed.

Signs of Benign ulcer

- The mucosal folds, as they approach the edge of the ulcer crater, were seen to be smooth and symmetrical.
- A smooth mound of oedema surrounding the ulcer.
- Smooth translucent band or collar surrounding the ulcer crater.

Endoscopy

Upper Gastrointestinal Endoscopy

Indications

- Dysphagia
- Caustic or Foreign Body indigestion
- Dyspepsia
- Persistant nausea and vomiting
- Need to obtain small intestine biospsy
- Acute or Chronic gastrointestinal bleeding
- Inflammatory bowel disease (as this may be associated) with duodenal Lesions mimicking a duodenal ulcer
- Chronic abdominal pain
- Suspected polyp or cancer

Complications of Endoscopy

- Perforation of viscus
- Bleeding
- Cardiac arrhythmias
- Reaction to medication (sclerosants)
- Vasovagal reaction
- Pulmonary aspiration

Complications of Peptic ulcer disease

1. Upper GI bleed
2. Perforation
3. Gastric outlet obstruction and fluid and electrolyte imbalance
4. Malignancy (with gastric ulcer less than 1% only)
5. Pancreatitis
6. Gastro-colic fistula

CHAPTER - III
MATERIALS AND METHODS

3.1 STUDY AREA AND SETTING

The study period was covered from June 2017 to July 2019 at the Govt. Siddha Medical College and Hospital, Palayamkottai- 627 002, Tirunelveli, Tamil Nadu. All procedures were carried out after getting the permission from Institutional Ethical Committee.

3.2 STUDY DESIGN

The study design is "a prospective open labeled non-randomized Phase-II clinical trial" of 40 Eri Gunmam (Peptic Ulcer Disease) subjects. The included subjects were newly diagnosed or already diagnosed as Ulcer patients with or without taking treatment. A written informed consent form was recruited in the study. The purpose of the study was explained to the patients before administration of trial drug. The patient's basic information, life style and siddha parameters were recorded before starting the treatment.

The total number of 40 patients of both sex, ages between 20-60 was taken for this study. The selected patients were treated with the trial drug for the study period (30 days).

3.3 SELECTION OF PATIENTS

I selected the patients according to proforma. The criteria for selection of patients are given below (3.3.1). After inclusion of cases, screening is done before starting the treatment.

Detailed personal history, family history, occupation, habits, clinical symptoms, medical history, and the duration of illness were recorded in all patients.

3.3.1 Inclusion Criteria

The parameters for the selection were as follows;

- Age : 20 – 60 Years
- Sex : Both male and female
- Patients having appropriate symptoms of
    - Burning sensation in upper abdomen (*Siru vayittril erichal*)

- Nausea (*Kudal kumattal*)
- Water brash (*Vayil neer ooral*)
- Headache (*Thalaivali*)
- Flatulence (*Vayiruppal, Eraichal*)
- Dizziness (*Kirukiruppu*)
- Excessive sweating (*Mayirkalil viyarvai peruguthal*)
- Loss of body weight (*Udal ilaithal*)
- Loss of appetite (*Pasiyinmai*)
- Neuritic pain (*Udal erichal*)
- Cough (*Irumal*)

- Patient with Clinical Assessment Score ≥ 2.
- Patient willing to sign the informed consent indicating that they understand the purpose and procedures required for the study and are willing to participate in the study.

3.3.2 Exclusion Criteria

Patients are excluded in the following conditions

1. H/o. Pregnancy & lactation
2. H/o. Recent Malignancy or Radiation Therapy
3. H/o. Haemetemesis or Melena
4. H/o. Pancreatitis
5. H/o. Inflammatory Bowel disease
6. H/o. Gastro oesophageal reflux diseases
7. H/o. Systemic Hypertension

3.4 TESTS AND ASSESSMENTS

A. CLINICAL ASSESSMENT
B. SIDDHA ASSESSMENT
C. LABORATORY INVESTIGATIONS

3.4.1 Clinical Assessment

Clinical Assessment Score

1. Burning sensation in upper abdomen (*Siru vayittril erichal*)
2. Nausea (*Kudal kumattal*)
3. Water brash (*Vayil neer ooral*)

4. Headache (*Thalaivali*)
5. Flatulence (*Vayiruppal, Eraichal*)
6. Dizziness (*Kirukiruppu*)
7. Excessive sweating (*Mayirkalil viyarvai peruguthal*)
8. Loss of body weight (*Udal ilaithal*)
9. Loss of appetite (*Pasiyinmai*)
10. Neuritic pain (*Udal erichal*)
11. Cough (*Irumal*)

$$\textbf{Clinical Assessment Score} = \frac{\textbf{Number of present symptoms}}{\textbf{Total number of symptoms}} \times 100$$

3.4.2 Siddha Assessment

- ❖ Kaalam
- ❖ Nilam
- ❖ Imporigal
- ❖ Kanmentherium
- ❖ Mukkutra nilaigal
- ❖ Ezhu udarthathukkal
- ❖ Kosangal
- ❖ Envagaithervu
- ❖ 14 vegangal
- ❖ Udarthee
- ❖ Thegi Ilakkanam
- ❖ Gunam
- ❖ Manikadainool

3.4.3 Lab Investigations

Blood - Complete blood analysis TC, DC, ESR, Hb, TRBC, Blood Sugar, Blood urea, Serum Cholesterol, Creatinine,

RoutineUrineAnalysis- Albumin, Sugar, Deposits,

The Lab investigations were carried out before and after administration of trial drug.

3.5 TREATMENT

3.5.1 Preparation of Trial Medicine (Annexure)

The *Vellarugu Chooranam* was selected from the Classical Siddha literature.

Reference: "Gunapadam Mooligai Mudhal Vagupu"- Page No: 843.

Author: K.S.Murugesa Mudhaliyar

3.5.2 Collection and authentication of trial Medicine (Annexure)

Plant material was freshly collected from in and around Palayamkottai, Tirunelveli, Tamilnadu. It was identified and authenticated by the Medicinal Botanist Dr.S.Sutha, Ph.D., Associate Professor, Department Of Medicinal Botany at Government Siddha Medical College and Hospital, Palayamkottai. Purification of plant material and preparation of the medicine was executed in the P.G Gunapadam Practical lab of Govt. siddha medical college, Palayamkottai.

3.5.3 Preclinical Analysis of trial Medicine

All the preclinical studies of the study drug, which includes Bio chemical and pharmacological studies, were carried out and results were cross checked before starting the treatment.

A. Biochemical Analysis - It was done in Dept.of Biochemistry, GSMCH, Palayamkottai
B. Phytochemical Analysis - Phytochemical analysis were done in K.M.College of Pharmacy, Madurai, Tamil nadu. The qualitative phytochemical analysis was carried out for major compound of interest such as Alkaloids, Flavanoids, Saponins, Phenol, Steroids, Glycosides, Tannins and Terpenoids. The analysis of phytochemicals has followed by Harborne and Onwukaemeand coworkers, 1999. The Quantitative estimation was done through spectrophotometric method for alkaloids estimation and FolinCio-calteau method for phenols.
C. Antimicrobial assay -
    - Antimicrobial activity was carried out in Inbiotics lab, Nagercoil.
    - It was done by using Agar well diffusion method.
    - Materials required for this study were,
        - Antibacterial activity - Muller Hinton agar medium(1L), Nutrient broth(1L), Streptomycin(10mg/ml), Culture of test organisms - ***E.coli, Bacillus Subtilis, Klebsiella pneumonia, Streptococcus mutans and***

Staphylococcus aureus (growth of culture adjusted according to McFarland Standard, 0.5%)

- Antifungal activity - Potato Dextrose Agar Medium (1 L), Clotrimazole (standard antifungal agent, concentration: 10mg / ml), Culture of test organisms - ***Aspergillus Niger, Candida albicans*** (growth of culture adjusted according to McFarland Standard, 0.5%)

D. Pharmacological studies - The Antiulcer, Anti spasmodic, Analgesic, Anti-Inflammatory studies of the trial medicine was done in K.M.College of Pharmacy, Madurai, Tamil nadu.

E. Toxicity study - Acute toxicity and sub acute toxicity of Vellarugu Chooranam carried out as per OECD-423 guidelines after the animal ethical clearance from Institutional Animal Ethics Committee. Toxicity studies were done in K.M College of Pharmacy, Madurai, and Tamilnadu.

3.5.4 ETHICAL REVIEW

The study was conducted in accordance with the ethical principles that are consistent with Good Clinical Practice guidelines and prior approvals was obtained before starting of the trial from the Institutional Ethical Committee of GSMCH, Palayamkottai (**GSMC-IV-IEC/2017/Br-I/05/29.05.2017**) and & Institutional Animal Ethical Committee (IAEC) (approval number is **321611005/KMCP/27/2018).** The study was registered in Clinical Trials Registry – India (CTRI) and the registration number is **CTRI/2018/04/012924. (Annexure)**

3.5.5 STUDY ENROLMENT

An open labeled non-randomized phase II clinical trial on *Vellarugu Chooranam* for Erigunmam was conducted in Government Siddha Medical College and Hospital, Palayamkottai, Tirunelveli. Totally forty cases were selected. 20 patients were treated as OP; remaining 20 patients were treated as IP. The clinical signs and symptoms of *VellaruguChooranam* of both sexes were selected and studied under the guidance of the professor, reader and lecturer of P.G. Pothu Maruthuvam Department.

Participants were informed in Tamil language, regarding the trial, the expected benefits and their right to opt-out of trial at any time without prejudice. Informed written consent was obtained from each participant, prior to his/her inclusion into the trial.

3.5.6 Withdrawal Criteria:

- Intolerance to the drug and development of adverse reactions during drug trial.
- Poor patient compliance and defaulters.
- Patient turned unwilling to continue in the course of clinical trial.
- Occurrence of any serious illness.

During the visit, body weight, blood pressure, cardiovascular and respiratory system were clinically recorded. During the treatment, if any adverse reaction or side effects of patients, immediately inform patient and pharmacovigilence committee. At the end of the study period, all the patients were instructed to follow diet. They were also advised to pursue the further treatment in the PG, Pothu Maruthuvam OP for the follow up study.

3.5.7 Outcome

Grade: 0 - Clinically cured	CAS=0-5
Grade: 1 - Clinically well improved	CAS=6-10
Grade: 2 - Marginal clinical improvement	CAS=11-40
Grade: 3 - Mild clinical improvement	CAS=41-70
Grade: 4 - No changes clinically	CAS $\geq$70

3.5.8 Statistical Analysis

All data were analysed using the SPSS 20.0 (IBM). Data were expressed as means and standard deviations. The significance of the difference between the means of the baseline and the final clinical assessment were tested using the paired “t” test. A probability value of <0.05 was considered to be statistically significant.

CHAPTER - IV

RESULTS AND OBSERVATIONS

4.1. PRECLINICAL STUDY

4.1.1 BIO-CHEMICAL ANALYSIS OF *"VELLARUGU CHOORANAM"*

Preparation of the extract: 5gms of chooranam was weighed accurately and placed in a 250ml clean beaker then 50ml of distilled water was added and dissolved well. Then it was boiled well for about 10 minutes. It was cooled and filtered in a 100ml volumetric flask and then it was made up to 100ml with distilled water. This fluid was taken foranalysis.

Table 4.1.1 Qualitative Analysis of *Vellarugu Chooranam*

S. No.	Experiment	Observation	Inference
1.	Test for calcium	A white precipitate was formed	presence of calcium
2.	Test for sulphate	A white precipitate was formed	presence of sulphate
3.	Test for chloride	A white precipitate was formed	presence of chloride
4.	Test for carbonate	No brisk effervesesence was formed	Absence of carbonate
5.	Test for starch	Blue colour was formed	presence of starch
6.	Test for ferriciron	No Blue colour was formed.	Absence of Ferric Iron.
7.	Test for ferrousiron	Blood red colour was formed.	Presence of Ferrous Iron.
8.	Test for phosphate	No yellow precipitate was formed.	Absence of phosphate.
9.	Test for albumin	No yellow precipitate was formed.	Absence of Albumin.
10.	Test for tannic acid	No blue black Precipitate was formed.	Absence of Tannic acid.
11.	Test for unsaturation	It gets decolouristd	Presence of unsaturated compound.
12.	Test for the reducing sugar	No colour change occurs.	Absence of Reducing sugar.
13.	Test for amino acid	Violet colour was formed.	Presence of Amino acid.
14.	Test for zinc	No white precipitate was formed	Absence of Zinc.

Inference:

Presence of Calcium, Sulphate, Chloride, Starch, FerrousIron, Unsaturated compound and AmnioAcid.

4.1.2 PHYTOCHEMICAL ANALYSIS OF *"VELLARUGU CHOORANAM"*

The VC was subjected to qualitative chemical investigation. Details of the various tests performed for the presence of phyto constituents is shown in Table 4.1.2.

Table 4.1.2 Phytoconstituents of *Vellarugu Chooranam*

Tests	VC
Alkaloids	
Mayer's test	Present
Dragendroff's test	Present
Hager's test	Present
Carbohydrates and glycosides	
Molisch test	Present
Legal's test	Present
Borntrager's test for anthraquinones	Present
Phytosterols	
Liebermann-Burchard test	Present
Salkowski test	Present
Flavanoids	
Shinoda test Magnesium turnings and hydrochloric acid (Presence of red color)	Present
Fluorescence test	Present
Tannins	
Ferric chloride test	Present
Potassium dichromate test	Present
Lead acetate test	Present
Proteins	
Millon's test	Present
Biuret test	Present
Ninhydrin test	Present
Fixed oils and fats	
Spot test	Absent
Saponification test	Absent
Lignin	
Phloroglucinol test	Present
Saponins	
Frothing test	Absent

Inference:

The Phytochemical screening of poly herbal formulation of VC showed the presence of *Alkaloids, Carbohydrates and Glycosides, Phytosterols, Flavanoids, Tannins, Proteins, Lignin, Saponins*.

4.1.3 ANTIMICROBIAL ANALYSIS OF VC

Table 4.1.3 Anti microbial Activity of VC

Sample Code	Bacteria Strains Name				
	***Staphylococcus aureus* (G+)**	***Streptococcus mutans* (G+)**	***Bacillus subtili*(G+)**	***Klebsilla pneumonia*(G-)**	***E.coli* (G-)**
VC	15	8	11	10	10
PC	27	17	14	28	18
NC	-	-	-	-	-

Keys

PC - Positive Control (Streptomycin)

NC - Negative Control

\- - No Zone

Mm - Millimetre

G+ - Gram Positive Organism

G- - Gram Negative Organism

Inference:

Trial drug showed the anti microbial activity against (MIC) both Gram positive bacteria (*Staphylococcus aureus, Streptococcus mutans, and Bacillus subtilis*) and Gram negative bacteria (*Klebsilla pneumonia, E.coli*).

4.1.4. PHARMACOLOGICAL STUDIES

4.1.4.1. ANTI ULCER ACTIVITY OF VELLARUGU CHOORANAM

Male Albino rats (180-220 gm) were feed a standard diet and water ad libitum. Gastric lesions were induced by administration of Acetyl salicylic acid at 200mg/ kg orally. The animals were housed in groups of five, each contains six animals and accommodated to room condition for at least two days before the experiments. Food

and water were freely available up to the experiments. The food was withdrawn on the day before the experiment, but free access to water was allowed.

Table 4.1.4.1a Experimental Design Anti-Ulcer Activity

GROUP NO	TREATMENT	DRUG /DOSE
Group-I	NORMAL CONTROL	CMC 1% (1ml)
Group-II	ULCER CONTROL	ASA 200mg/ kg
Group-III	STANDARD CONTROL	OMEPRAZOLE 2mg /kg (Half hour before ASA administration)
Group-IV	TREATMENT CONTROL	VC100mg/kg orally (Half hr before ASA administration)
Group-V	TREATMENT CONTROL	VC 200mg/kg orally (Half hr before ASA administration)

Aspirin Induced &Pyloric Ligation Ulcer Model

The albino rats were divided in to five groups, each group contains six animals. The study was carried out for four days, after administration of the treated dose 30 minafter; the rats were treated with aspirin 200mg /kg. This process was carried out for three days, on the third day after administration of drug the rats were subjected to fasting. On the next day pyloric ligation was made. The rats were sacrificed four hrs later by cervical dislocation and the esophagi were clamped, the stomach was exposed carefully, opened along the greater curvature, the luminal contents were removed, the total volume of gastric secretion, total acidity, free acidity were estimated by titration method. The ulcer index was calculated according to the method of gangrly and Bhatnagar. The lesions were counted with the aid of hand lens (10x) and each gives a severity rating as follows.

Table 4.1.4.1b Ulcer Score

ULCER SCORE	DESCRIPTIVE OBSERVATION
0	Normal colored stomach
0.5	Red coloration
1	Spot ulcers
1.5	Haemorrhagic streak
2	Ulcers
3	Perforation

Mean ulcer score for each animal was expressed as ulcer index. The percentage of ulcer inhibition was determined as follows

Protection of ulcer (%) = $\frac{\text{Control mean ulcer index- test mean ulcer index}}{\text{Control mean ulcer index}} \times 100$

values are expressed as MEAN ± SEM, values were find out by using one way ANOVA followed by Newman kevel's multiple range test, probability value $p< 0.01$ was considered significant.

Table 4.1.4.1c Antiulcer activity of VC

Group	Treatment	Dose mg/kg	Total volume of gastric secretion (ml/100 g)	Total acidity (meq/l/100g)	PH	Ulcer score	% protection
I	Normal control	1 ml of 1%cmc	3.5± 0.58	425.42± 21.30	2.2± 0.19	0.29± 0.01	0.000
II	Ulcer control	200mg/kg ASA	5.6± 0.84*a	488.45± *a 23.15	1.2±*a 0.11	2.0±*a 0.15	0.000
III	Standard control	2mg/kg omeprazole	2.7± 0.32	330.85± 15.30	4.0± 0.54	0.50± 0.05	75.00
IV	Treatment control	VC 100mg/kg	3.0± 0.38*b	375.2±*b 18.15	3.0±*b 0.28	0.83±*b 0.09	58.50
V	Treatment control	VC 200mg/kg	3.4± 0.40*b	360.2±*b 16.08	2.4±*b 0.28	0.73±*b 0.10	63.50

Values are expressed as Mean± SEM

*a – Values are significantly different from Normal control group at P<0.01

*b -- Values are significantly different from ulcer control group at P<0.01

Results

Administration of 200 mg/kg ASA suspension intragastrically consistently caused hemorrhagic lesions in the mucosa of the glandular stomach, indicating true ulcer formation as stated in histological findings. Pretreatment of rats with siddha formulation Vellarugu chooranam through orally at 100 and 200mg/kg prevented gastric ulcerogenesis significantly. However, it's seemed to be less efficient than standard drug like omeprazole.

4.1.4.2 ANTI-INFLAMMATORY AND ANALGESIC ACTIVITIES OF VELLARUGU CHOORANAM

Acute Inflammatory Activity

The Carrageenan-induced rat paw edema is used widely as a working model of inflammation in the search for new anti-inflammatory drug. The anti inflammatory activity of the Siddha formulation Vellarugu chooranam was evaluated by carrageenan-induced rat paw edema method. Albino Wistar rats (180 ± 5 g) were used. Anti inflammatory activity was measured using carrageenan induced rat paw edema assay. The rats were divided into 5 groups of 5 animals each. Group I were given normal saline and treated as negative control. Rats of Group II were treated with carrageenan (1%w/v) in saline in the subplantar region of the right hind paw. Rats in Group III were administered Indomethacin (10 mg/kg/bw) and considered as standard. Rats from Group IV and V were given two doses Siddha formulation (100 and 200 mg/kg bw). Acute paw edema was induced by injecting 0.1 ml of 1% (w/v) carrageenan solution, pre-pared in normal saline. After 1 hr, 0.1 ml, 1% carrageenan suspension in 0.9% NaCl solution was injected into the sub-plantar tissue of the right hind paw. The linear paw circumference will be measured at hourly interval for 4 hr. The perimeter of paw was measured by using vernier callipers. Measurements were taken at 0–4 hr after the administration of the carrageenan.

The anti-inflammatory activity was calculated by using the relation

$$\%\text{inhibition of edema} = \frac{T - T0}{T} \times 100$$

T-Thickness of paw in control group; T0-Thickness of paw edema in the test compound treated group.

Carrageenan Induced Pleurisy in Rats

The animals were divided into five groups of five rats each as described in the carrageenan induced paw edema model and each were pretreated with siddha formulation (100 and 200 mg/kg, p.o.), Indomethacin (10 mg/kg, p.o.) or normal saline (0.1 ml).One hour later all the animals were received 0.25 ml of an intrapleural injection of 1 % carrageenan on the right side of the thorax. The animals were sacrificed 3 h after carrageenan injection by ether inhalation. One ml of heparinized Hank's solution was injected into the pleural cavity and gently massaged to mix its

contents. The fluid was aspirated out of the cavity and the exudates were collected. The number of migrating leukocytes in the exudates was determined with Neubauer chamber.

The values of each experimental group were expressed as mean ± SEM and compared with the control group.

Analgesic Activity

The acetic-acid writhing test was performed using the reported procedure Groups of rats (n=6), were administered with 100 and 200 mg/Kg of Siddha formulation *Vellarugu chooranam*, 10 mg/Kg Diclofenac as positive control group and 1 mL distilled water as negative control group. After 30 minutes the animals were administered with i.p. injection of 0.1 mL acetic acid (0.6%). Then the count of abdominal contractions of animals during 30 minutes after acetic acid injection was reported and the Percentage Analgesic Activity (PAA) was calculated by using the following formula:

$$PAA = ((C- CD)/CD) \times 100$$

C = Mean of contractions count in animals treated with different doses of siddha formulation *Vellarugu chooranam* and Diclofenac sodium,

CD = Mean of contractions count in animals served as negative control.

Results

The effect of siddha formulation Vellarugu chooranam on carrageenan-induced edema in rats is shown in **Table 4.1.4.2a**. The results obtained indicate that the Siddha formulation Vellarugu chooranam had significant anti-inflammatory activity in rats. The siddha formulation Vellarugu chooranam was reduced the edema induced by carrageenan by 60.11% and 63.48% on oral administration of 100 and 200 mg/kg, as compared to the untreated control group. Indomethacin at 10 mg/kg inhibited the oedema volume by 65.73%.

Table 4.1.4.2a Effect of VC on Carrageenan Induced Paw Edema in Rats.

Treatment	Dose (mg/kg, p.o.)	Mean increase in paw volume(ml)	% Decrease in paw volume
Normal control	10ml/kg saline	1.12 ± 0.11	
Toxic control	0.1ml,1% Carrageenan	3.56±0.30*a	
Standard control	10mg/kg Indomethacin	1.22±0.14*b	65.73%
Treatment control	100mg/kg VC	1.42 ± 0.19*b	60.11%
Treatment control	200mg/kg VC	1.30 ± 0.16*b	63.48%

Table 4.1.4.2 b Effect of VC on Carrageenan Induced Pleurisy in Rats.

Treatment	Dose (mg/kg, p.o.)	Pleural exudates (ml)	Leukocytes (×103cells/ml)
Normal control	10ml/kg saline	0.16±0.08	0.40±0.05
Toxic control	0.1 ml, 1% carrageenan	0.48±0.20*a	4.24±0.39*a
Standard control	10mg/kg Indomethacin	0.18±0.10*b	0.48±0.08*b
Treatment control	100mg/kg VC	0.24±0.13*b	0.58±0.12*b
Treatment control	200mg/kg VC	0.20±0.11*b	0.50±0.09*b

The administration of Vellarugu chooranam on carrageenan-induced pleurisy in rats was explained in Table 4.1.4.2b. The volume of pleural exudates in the toxic control group was reduced in 0.48±0.20 ml. Animals treated with the siddha formulation Vellarugu chooranam (100 and 200 mg/kg, p.o.) decreased the pleural exudates to 0.24±0.13 ml and 0.20±0.11.Treatment with Indomethacin (10 mg/kg, p.o.) produced the exudates of 0.18±0.10 ml. The leukocyte count for the control group was found to be $4.24\pm0.39\times10^3$ cells/ml. Animals treated with the siddha formulation Vellarugu chooranam and standard produced a leukocyte migration of $0.58\pm0.12\times10^3$, $0.50\pm0.09X10^3$ and $0.48\pm0.05\times10^3$cells/ml, respectively.

The study showed that the application of different doses of Siddha formulation *Vellarugu chooranam* had significant analgesic effects in the animals under investigation. The results of doses 100 and 200 mg/Kg were significant and comparable with the effect of Diclofenac sodium in analgesic activity.

Table 4.1.4.2c Effects of VC on acetic acid–induced writhing response

Groups	Treatment	(number of writhing movements)(Mean±S.E)	Percentage
Group I	Distilled water	29.00 ± 2.45	
Group II	Diclofenac sodium 10mg/kg	6.08 ± 0.90*b	79.03%
Group III	100mg/kg VC	14.25 ± 1.65*b	50.86%
Group IV	200mg/kg VC	13.05 ± 1.30*b	55.00%

* Values are expressed as mean ± SEM.

*b) Values are significantly different from Toxic control G2 at P<0.01.

The results are reported as mean ± S.E.M. The statistical analyses were performed using one way analysis of variance (ANOVA). Group differences were calculated by post hoc analysis using Tukey's test. For all tests, differences with values of P<0.05 were considered significant.

Discussion

The tests performed with VC in the pleurisy model showed that VC behaves as an inhibitor of leukocyte migration and the formation of pleural exudates when given orally, as reported earlier. Thus it can be concluded that VCpossess significant anti-inflammatory activity in rats. Further studies involving the purification of the preparation and the investigations in the biochemical pathways may result in the development of a potent anti-inflammatory agent with a low toxicity and better therapeutic index.

The analgesic activity was assessed by writhing test, which has been reported to be useful for investigation of peripheral anti nociceptive activity and performed as a chemical pain mode. The VCdemon treated a dose-dependent, significant anti nociceptive activity in animal models of pain. Acetic acid believed to increase the PGE2 and PGF2α in peritoneal fluid. The analgesic activity shown in models of pain is indicative VC might possess centrally and peripherally mediated anti nociceptive properties.

Chemical components of VC such as flavonoids, saponins or phenolic compounds may be responsible for the anti nociceptive activities of this formulation.

Since the findings of this study revealed a significant analgesic effect of the VC, it can be concluded that terpenoids and specially saponins of VC may be responsible for the observed analgesic effect which should be proved by further investigations.

Conclusion

It can be concluded that possesses *anti-nociceptive properties which are probably mediated via inhibition of prostaglandin synthesis as well as central inhibitory mechanisms which may be of potential benefit for the management of pain and inflammatory disorders.*

4.1.4.3 INVITRO ANTI-SPASMODIC ACTIVITY OF VELLARUGU CHOORANAM

Rats were anesthetized and sacrificed by euthanesia method followed by exsanguinations. The ileum was dissected out immensed in tyrode's solution and cleaned off the mesentry.respective segments of 2-3 cm long were mounted in a 30ml tissue inner organ bath filled with mixture of 95% o2 and 5% co2 and maintained at 37^{o}c.the composition of tyrode's solutions (in mm for one litre) was 9mg KCl, 0.1mg NaCl 0.1mg nahco3, 0.42 mg NaH2PO4, 0.6mg glucose and ph value was 7.4.

Dose response curve of acetylcholine were recorded with dose of 0.1, 0.2, 0.4, 0.8, 1.6, 3.2(100mg/ml) using student organ bath, sheerington rotating drum with help of frontal writing lever. Contact time of 60sec and base line of 30 sec, time cycle were opted for proper recording of the responses in presence of tyrode's solutions as stock-i solutions.Then the same concentrations dependent responses of acetyl choline (ach) using same procedure for a mixture tyrode solutions with vellarugu chooranam with a concentrations of 1mg/ml as a stock-11 solutions were recorded.Lastly the same concentrations dependent responses of ach for a mixture of tyrode's solutions with atropine as standard (antispasmodic agents) as a stock iii solutions were recorded.

Discussion

From the present study it was observed that acetylcholine alone causes contraction of excised rat ileum. But when acetyl choline was given in presence of vellarugu chooranam there was marked decrease in contraction of ileum was observed. This revealed that vellarugu chooranam possess a high degree of spasmolytic (anti-spasmolytic) by blocking cholinergic receptors.

Conclusion

From all observation and results obtained for the present study it was concluded that vellarugu chooranam exhibits promising anti-spasmodic activity also when compared with standard anti-spasmodic agent (atropine) it was found that vellarugu chooranam has comparatively less potent spasmolytic activity than atropine.

Table no 4.1.4.3a Dose response relationship observation of acetylcholine.

S.No	Concentration/dose	Ach response (cm)
1	10/0.1	2.7
2	20/0.2	3.3
3	40/0.4	3.8
4	80/0.8	4.3
5	160/1.6	4.9
6	320/3.2	5.5

Table no 4.1.4.3b Dose response relationship observation of atropine

S.No	Concentration/dose	Atropine response (cm)
1	10/0.1	------
2	20/0.2	------
3	40/0.4	------
4	80/0.8	------
5	160/1.6	------
6	320/3.2	------

Table no 4.1.4.3c Dose response relationship observation of ach and VC

S.No	Concentration/dose	Ach +VC (cm)	% response
1	10/0.1	2.3	85.18%
2	20/0.2	2.7	81.81%
3	40/0.4	2.9	76.31%
4	80/0.8	3.1	72.09%
5	160/1.6	3.3	67.34%
6	320/3.2	3.7	67.27%

4.1.5. TOXICOLOGICAL STUDIES

4.1.5.1. ACUTE AND SUB ACUTE TOXICITY OF *VELLARUGU CHOORANAM*

Acute and Subacute Toxicity Studies:

Male and female Wister albino rat weighing 180 ± 10 g are used for the present study. The animals are divided into three groups of six animals, totally 18 animals were used in this acute toxicity study. The Group I animals are administered a single daily dose of 0.5 ml of Tween 80 orally for 15 days. In Group II are administered with (300 $mg.kg^{-1}$b.w.VAC).once a day for 15 days. The Group III are administered 2000 $mg.kg^{-1}$b.w. of the VAC once daily for 15 days for acute toxicity studies.

In sub acute toxicity studies Wister albino rat weighing 180 ± 10 g five groups were selected, totally 30 animals are used. Group II to V animals weretreated 50 mg,100,400 mg/kg/Bw once daily for 28 days .Where as Group I treated control group for this study.The group of animals was weighed every five days, The weight variation, Hematological parameters, the biochemical, serological analysis were carried out before and after studies. All studies were carried out under OECD -423 guidelines.

Results and Discussion

Acute toxicity study for VC

There was no mortality or morbidity observed in animals through the 15-days period following single oral administration at all selected dose levels of the Vellarugu chooranam (VC). Acute toxicity study of Vellarugu chooranam (VC) on experimental

rat, noted in acute and mortality ratio. The animals did not show any physical changes in general appearance during the observation period. Morphological characteristics such as skin, eyes, and nose appeared normal. No tremors, convulsion, salivation, diarrhea, lethargy or unusual characters were observed.(Table no 4.1.5.1a.)

Table no 4.1.5.1a. Sign of Acute toxicity and mortality ratio

	Dose ($mg.kg^{-1}$)	**Sign of Toxicity ($ST.NB^{-1}$)**	**Mortality ($D.S^{-1}$)**
Group I	0	0/3	0/3
Group II	300	0/3	0/3
Group III	2000	0/3	0/3

ST- a sign of toxicity; NB- normal behavior; D- died; S- survive (n=3).

Sub-acute Toxicity

The effect of Vellarugu chooranam (VC) was observed for their effect on the body weight changes. From the study, it was observed that significant increase ($p<0.05$) in body weight in all the animals. The results are described in Table 4.1.5.1b The values are expressed as Mean ± S.E.M. n=6. The results of group I were compared with other groups such as II, III, IV, and V. The statistical analysis was carried out using one way ANOVA method, where **P<0.01 *P<0.05.

Table 4.1.5.1b Effects of VC on changes in body weight

Treatment	**Day 1**	**Day 7**	**Day 14**	**Day 28**
Control	187.15±6.83	187.45 ±6.20	196.15 ±6.34	196.7±6.52
VC 50 $mg.kg^{-1}$	194.30 ±6.44	193.30 ±6.40	198.25 ±6.72	198.30±6.77*
VC 100 $mg.kg^{-1}$	186.35 ±5.74	189.30 ±6.30	196.55 ±7.17	197.36±6.33*
VC 200 $mg.kg^{-1}$	195.30 ±7.22	198.15±6.54	198.90 ±7.25**	206.45±7.28**
VC 400 $mg.kg^{-1}$	187.65 ±6.09	192.15 ±5.63	195.60 ±6.34**	207.66±7.39**

In Table no 4.1.5.1c. The effects of Vellarugu chooranam (VC) on kidney, heart, liver and brain of the rat were observed. From the study, it was clear that significant ($p<0.01$) changes in the weights of various organs of the animals occurred with higher doses of the extract (400 $mg.kg^{-1}$bwt), but macroscopic examinations did not show any changes in colour of the organs of the treated animals compared with the control group. The values are expressed as mean ± S.E.M. n=6. The results of

group I were compared with other groups such as II, III, IV, and V. The statistical analysis was carried out using one way ANOVA method, where **P<0.01.

Table no 4.1.5.1c Effects of VC on Changes in internal organs

Treatment	Heart (g)	Kidney (g)	Liver (g)	Brain (g)
Control	0.38 ± 0.05	0.67± 0.03	3.32± 0.05	0.68± 0.05
VC 50mgKg^{-1}	0.39± 0.02	0.83± 0.03	3.44± 0.03	0.71± 0.3
VC 100 mg.kg^{-1}	0.39± 0.06	0.81± 0.04	3.36±0.02	0.69± 0.2
VC 200 mg.kg^{-1}	0.38± 0.04	0.76± 0.02	3.34± 0.02	0.76± 0.05
VC 400 mg.kg^{-1}	0.37± 0.03	0.77± 0.03	3.37± 0.03	0.78± 0.05

Effects of VC on Changes in Biochemical Lipid profiles

In table no 4.1.5.1d. Shows that animals has significant decrease ($p<0.05$) in the plasma glucose level in treated rat especially at higher dose (400 mg.kg^{-1}) compared with other control groups. Significant decreased ($p<0.05$) in the plasma total cholesterol (TC), triglyceride (TG) and LDL-cholesterol levels were observed. But a significant increased ($p<0.05$) in HDL-cholesterol levels were observed in all the treated animals compared with the control animals. Table no 4.1.5.1e. AST, ALT and ALP levels were also normal in the VC. From the results of a biochemical study, there was no evidence of severe toxicity associated with the administration of higher concentration.The values are expressed as mean ± S.E.M. n=6. The results of group I were compared with other groups such as II, III, IV, and V. The statistical analysis was carried out using one way ANOVA method, where **P<0.01 *P<0.05.

Table.4.1.5.1d Effects of VC on Changes in Biochemical Lipid profiles

Treatment	Glucose (mg.dl^{-1})	Cholesterol (mg.dl^{-1})	Triglyceride (mg.dl^{-1})	HDL (mg.dl^{-1})	LDL (mg.dl^{-1})
Control	97.65± 0.62	42.62± 0.56	31.25± 0.45	138.25± 0.55	87.15±1.72
VC 50 mg.kg^{-1}	95.50± 0.56	28.85± 0.25*	16.22± 0.23*	178.28± 0.65*	74.59±1.28
VC 100 mg.kg^{-1}	92.45± 0.47	29.74± 0.26*	18.42± 0.28*	168.18±0.78*	72.84±1.10
VC 200 mg.kg^{-1}	93.25± 0.55**	35.18± 0.30	20.84± 0.38*	187.30± 0.84*	51.60±1.30
VC 400 mg.kg^{-1}	89.25± 0.45**	35.78± 0.28	22.28± 0.34*	185.2± 0.85*	49.50±0.84

Table 4.1.4.4e.The values are expressed as mean ± S.E.M. n=6. The results of group I were compared with other groups such as II, III, IV, and V. The statistical analysis was carried out using one way ANOVA method, where **P<0.01 *P<0.05.

Table 4.1.5.1e Effects of VC on Changes in hepatic enzymes

Treatment	AST ($IU.l^{-1}$)	ALT ($IU.l^{-1}$)	ALP ($IU.l^{-1}$)	TP ($g.l^{-1}$)	ALBUMIN ($g.l^{-1}$)
Control	329.5±12.40	70.5± 3.18	246.58± 8.80	62.85± 3.32	42.15±2.35
VC 50 $mg.kg^{-1}$	318.0±9.50**	66.5± 2.20**	259.10± 2.75**	63.30± 2.32	39.30±2.65
VC 100 $mg.kg^{-1}$	319.3±7.20**	66.1± 3.15**	263.18± 6.70**	73.15± 2.82	41.30±3.05
VC 200 $mg.kg^{-1}$	314.4±7.95	61.4± 2.90	258.00± 5.20	62.25± 3.32	43.20±2.75
VC 400 $mg.kg^{-1}$	324.2± 8.20	63.3± 3.52	262.40± 4.40	67.05± 2.58	42.48±2.70

Table 4.1.5.1f.The effects of VC were observed for its effect on hematological parameters in experimental rat. The final study, a significant increase (p<0.01) in the hemoglobin, RBC values were noted in after treated groups.There was no significant changes in the calcium level in all the treated animals compared to the control.The values are expressed as mean ± S.E.M. n=6. The results of group I were compared with other groups such as II, III, IV, and V. The statistical analysis was carried out using one way ANOVA method, where *P<0.05.

Table 4.1.5.1f Hematological parameters Changes in rat

Treatment	Haemoglobin ($gm.dl^{-1}$)	RBC (10^6 /mm^3)	WBC (10^6 /mm^3)	Calcium ($mg.dl^{-1}$)
Control	11.3± 0.25	10.10± 0.02	12.4± 0.05	9.45 ±0.02
VC 50 $mg.kg^{-1}$	11.5± 0.35*	9.46± 0.45*	10.5± 0.13*	9.75 ±0.02
VC 100 $mg.kg^{-1}$	12.3± 0.15*	10.50± 0.02*	9.3± 0.32*	9.27 ±0.20
VC 200 $mg.kg^{-1}$	10.7± 0.20*	9.28± 0.12*	12.4± 0.03*	9.61 ±0.13
VC l00 $mg.kg^{-1}$	12.5± 0.26*	10.45± 0.04*	10.5± 0.01*	9.21 ±0.02

Discussion

In the present study, where the acute toxicity study of Vellarugu chooranam (VC) was carried out as per OECD-423 guidelines. No mortality was observed in control group as well as treated groups animals,maximum dose of 2000 $mg.kg^{-1}$ was not produced any toxicity. Hence, $1/10^{th}$ of 2000 $mgkg^{-1}$ i.e. 200 $mg.kg^{-1}$ of dose was selected as a minimum dose for acute toxicity study.

The results of sub acute toxicity study shows that animals treated with VC showed normal growth pattern and body weight compared with control rats treated with normal saline. So the changes in body weight can be used as an indicator of adverse effects of drugs and chemicals. Serum cholesterol and proteins mainly regulated via synthesis in the liver and increase or decrease in serum concentrations of constituents suggest liver toxicity. All test animals were subjected to gross necropsy .There was a slight decrease in plasma glucose level, when higher doses of VC ($400mg.kg^{-1}$) were administered in the treated rats..The significant increase in the levels of hemoglobin (Hb) was found in treatment with VC with a higher dose of $200mgkg^{-1}$. The possible reason could be that one of the constituents VC may increase absorption of iron.

The overall results suggest that VC is non toxic to the haematopoietic and leucopoietic system. The haematopoietic and leucopoietic systems are the most sensitive targets for toxic compounds and an important index of physiological and pathological status in man and animal. Therefore, it is possible to assume that the VC is non haematotoxic effects.

4.2. CLINICAL STUDY

40 Patients with the Clinical Assessment Score (Grade ≥2) were recruited to the treatment with the trial drug Vellarugu chooranam (30mg/kg/bw) twice a day orally before food.

The following parameters are evaluated, which recorded at the time of enrolment

1. Gender distribution
2. Age (Kaalam) distribution
3. Occupational status
4. Religion status
5. Dietary Habits
6. Dietary time habits
7. Marital Status
8. Personal Habits
9. Nilam
10. Kaalam (Season)
11. Imporigal
12. Kanmenthiriyam
13. Uyir thathukal
    - Vatham
    - Pitham
    - Kabam
14. Udal thathukal
    - Increased
    - Decreased
15. Kosangal
16. Envagai thervugal
    - Naadi
    - Sparism, Naa, Niram, Mozhi, Vizhi, Malam
17. Neerkuri
    - Niram
    - Manam, Edai, Nurai, Enjal
18. Neikuri

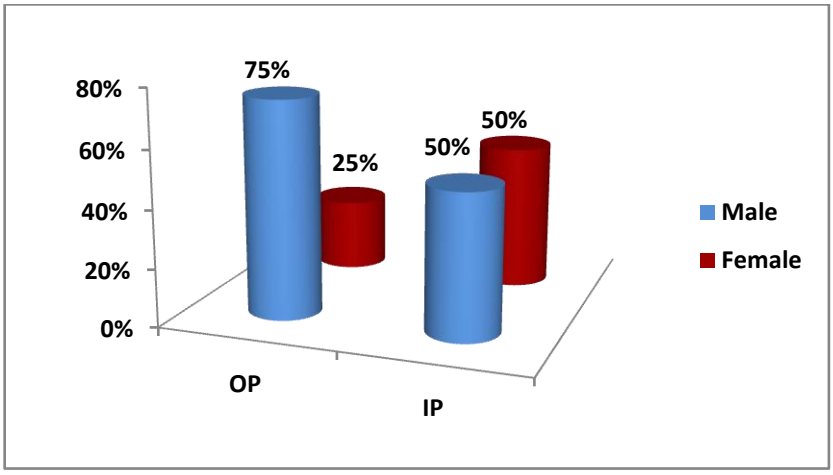
19. Habits of controlling 14 Vegangal
20. Udarthee
21. Thegi Ilakkanam
22. Gunam
23. Manikadainool
24. Distribution for clinical assessment
    - Based on clinical symptoms before and after treatment
    - Based on grade before and after treatment
25. Difference analysis for
    - Evaluating the significance between CAS and outcome

4.2.1: Gender

Table 4.2.1: Distribution of Gender

S. No	Gender	Out patients		In patients	
		No. of Cases	Percentage	No. of Cases	Percentage
1.	Male	15	75%	10	50%
2.	Female	5	25%	10	50%

Figure 4.2.1: Distribution of gender



Inference:

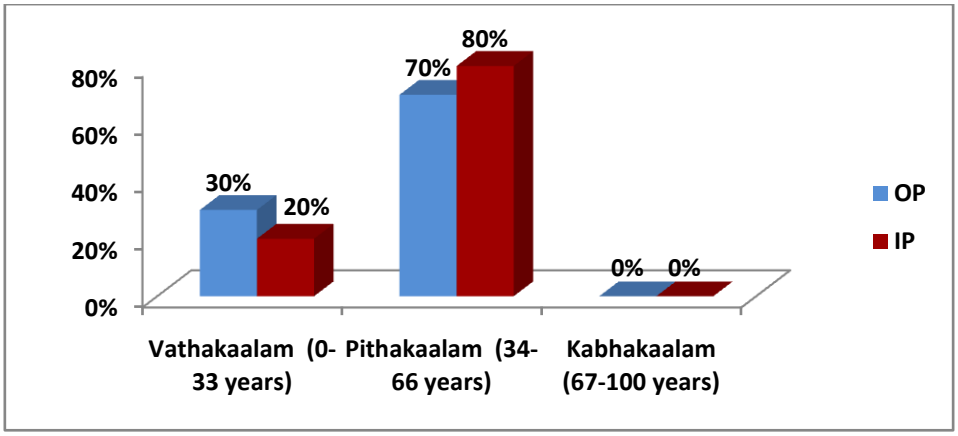
From above table, In patients of both male and female were equally affected, out patients 75% of male and 25% of female were affected.

4.2.2: Age

Table 4.2.2:
Distribution of Age

S. No	Age	Out patients		In patients	
		No. of Cases	Percentage	No. of Cases	Percentage
1.	Vathakaalam (0-33 years)	6	30%	2	20%
2.	Pithakaalam (34-66 years)	14	70%	18	80%
3.	Kabhakaalam (67-100 years)	0	0%	0	0%

Figure 4.2.2:
Distribution of Age



Inference:

The above table revealed that majority of both 70% of Out patients and 80% of In patients came under pitha kaalam, 30% of Out patients and 20% of In patients came under vatha kaalam.

4.2.3: Occupation

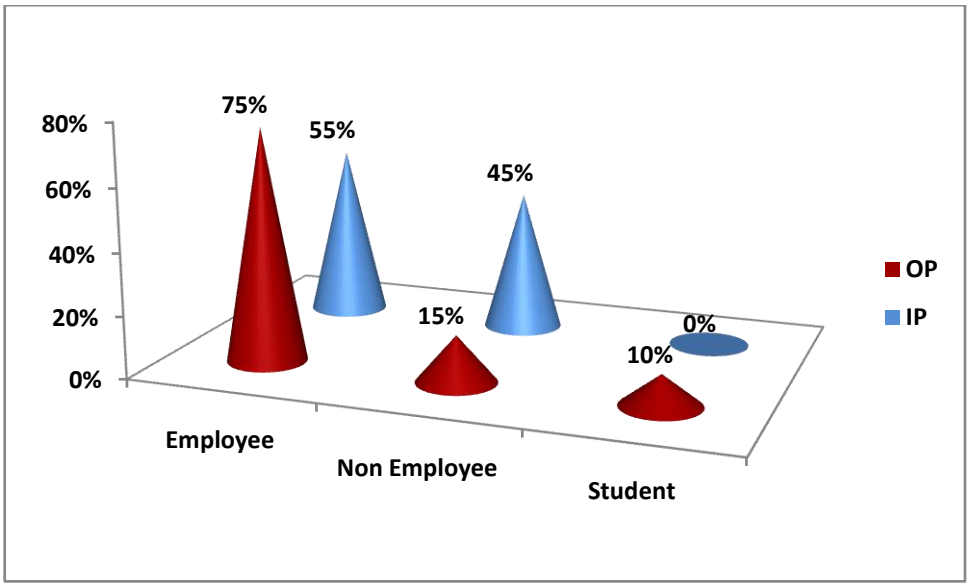
Table 4.2.3:

Distribution of Occupation

S. No	Occupation	Out patients		In patients	
		No. of Cases	Percentage	No. of Cases	Percentage
1.	Employee	15	75%	11	55%
2.	Non Employee	3	15%	9	45%
3.	Student	2	10%	0	0%

Figure 4.2.3:

Distribution of occupation



Inference:

Among out patients, 75% were employees, 15% were Non Employees and 10% were students. Among In patients 55% were Employees and 45% were Non Employees.

4.2.4: Religion

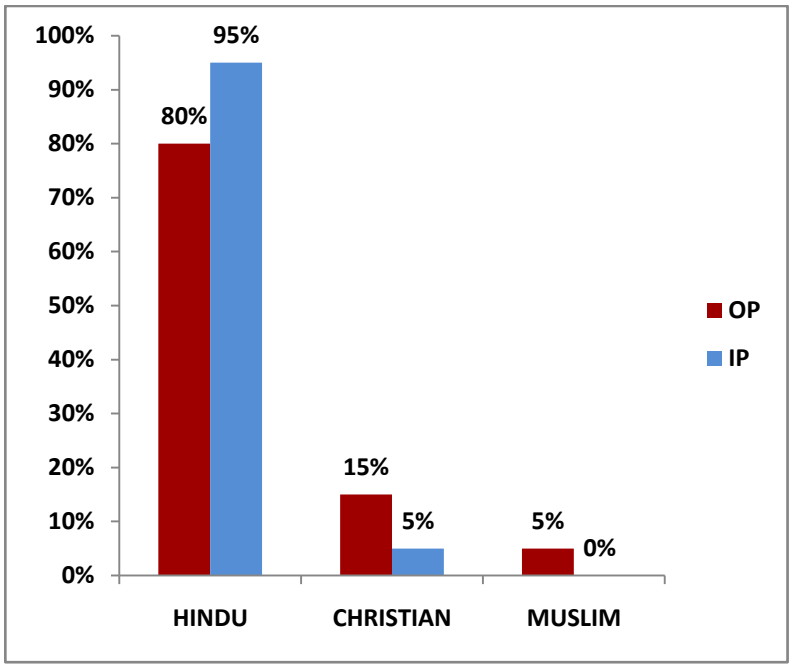
Table 4.2.4:

Distribution of Religion

S. No.	Religion	Out patients		In patients	
		No. of Cases	Percentage	No. of Cases	Percentage
1.	Hindu	16	80%	19	95%
2.	Christian	3	15%	1	5%
3.	Muslim	1	5%	0	0%

Figure 4.2.4:

Distribution of religion



Inference:

Among out patients 80% were Hindus, 15% were Chirstians and 5% were Muslims. Among In patients 95% were Hindus and 5% were Christians.

4.2.5: Dietary Habits

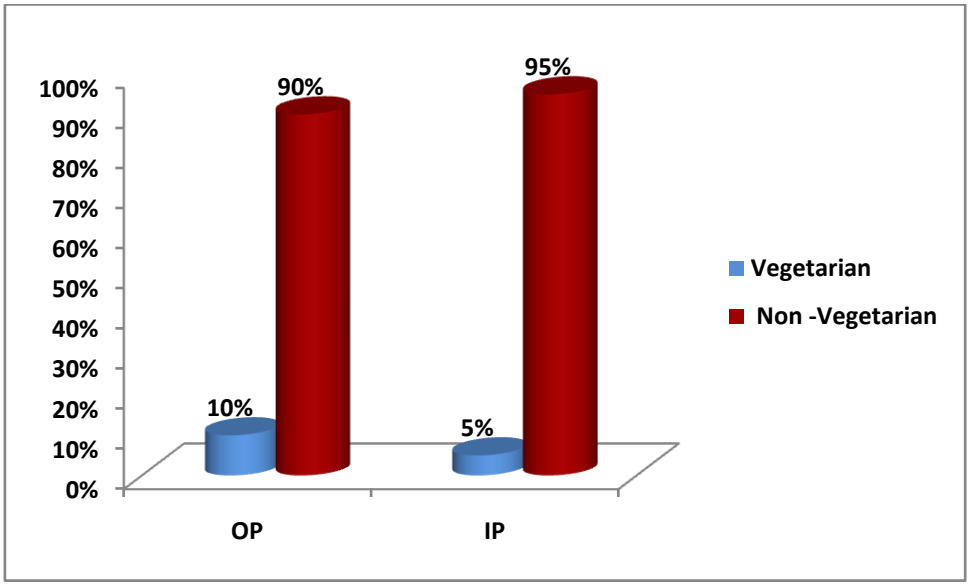
Table 4.2.5:

Dietary Habits

S. No.	Diet	Out patients		In patients	
		No. of Cases	Percentage	No. of Cases	Percentage
1.	Vegetarian	2	10%	1	5%
2.	Non – Vegetarian(both)	18	90%	19	95%

Figure 4.2.5:

Distribution of Dietary Habits



Inference:

This table revealed that majority of Out patients 90% and In patients 95%, were non vegetarian, compared to pure vegetarian.

4.2.6: Dietary Time Habits:

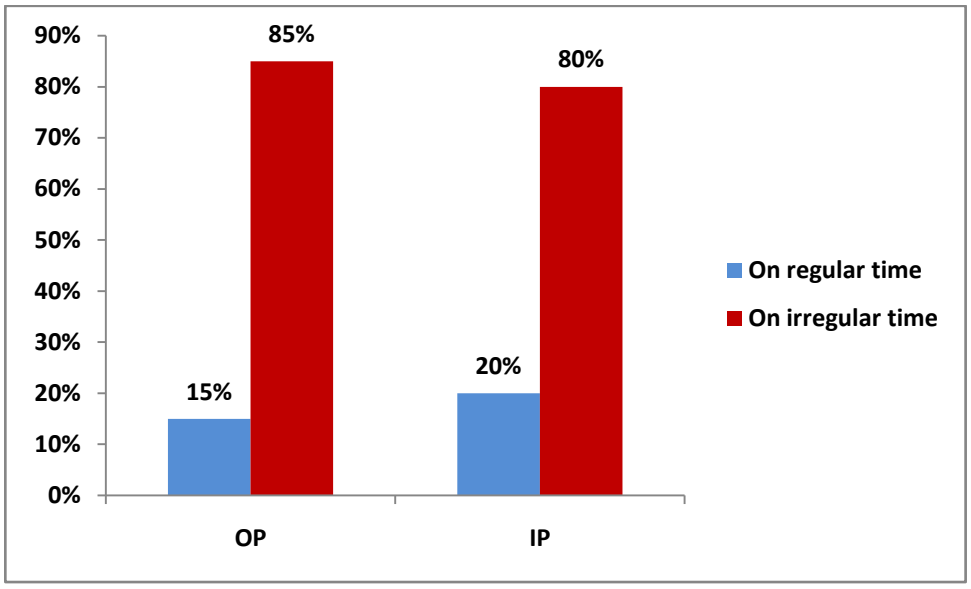
Table 4.2.6:

Distribution Dietary Time Habits

S. No.	Diet	Out patients		In patients	
		No. of Cases	Percentage	No. of Cases	Percentage
1.	On regular time	3	15%	4	20%
2.	On irregular time	17	85%	16	80%

Figure 4.2.6:

Distribution of Dietary Time Habits



Inference:

Among 20 out patients, 85% had Irregular Dietary time Habits. Among In patients 80% had Irregular Dietary time Habits, compared to Regular Dietary time Habits.

4.2.7: Marital Status

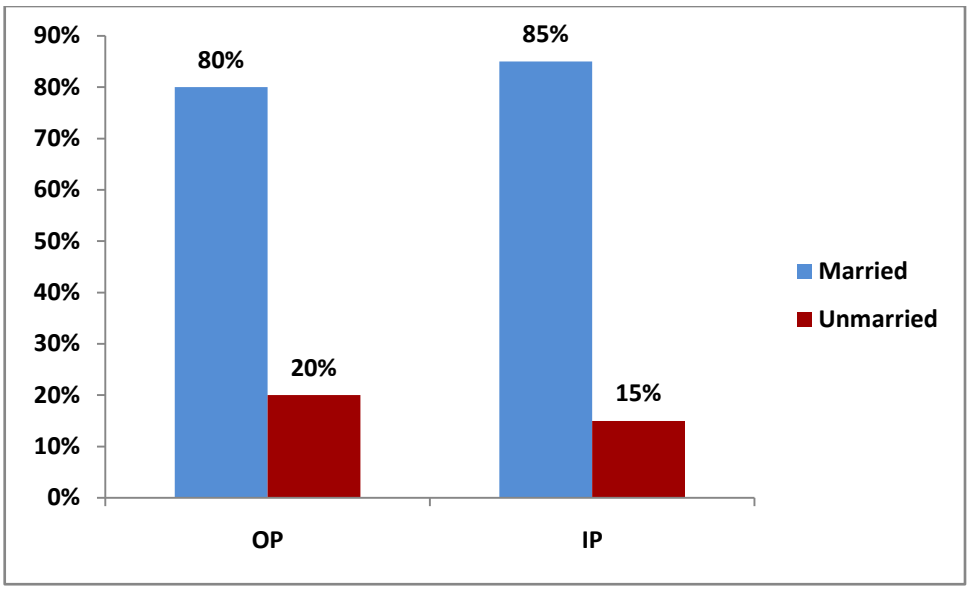
Table 4.2.7:

Distribution of Marital Status

S. No.	Marital	Out patients		In patients	
		No. of Cases	Percentage	No. of Cases	Percentage
1.	Married	16	80%	17	85%
2.	Unmarried	4	20%	3	15%

Figure 4.2.7:

Distribution of Marital Status



Inference:

Among 20 Out patients 80% were married, 20% were unmarried. Among 20 Inpatients 85% were married, 15% were unmarried.

4.2.8: Personal Habits

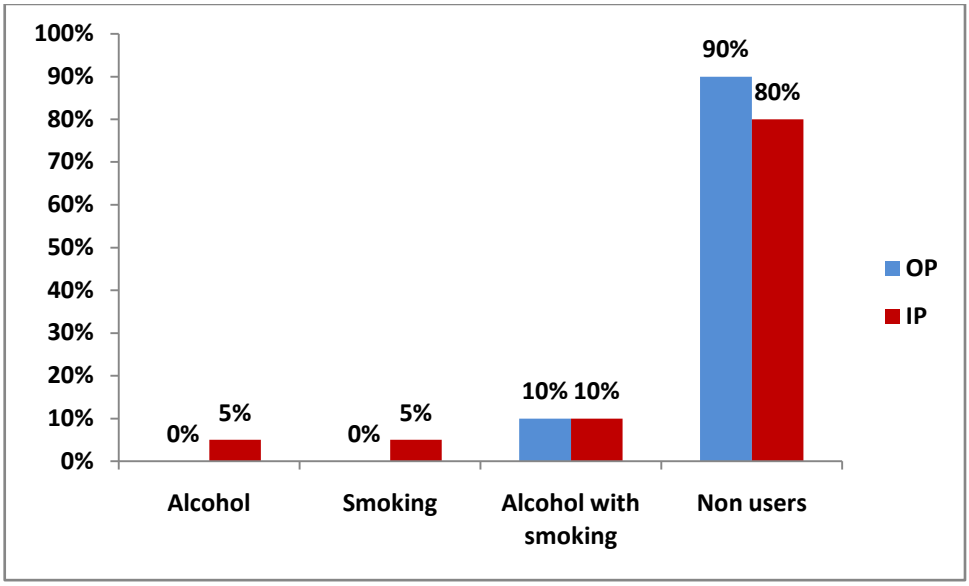
Table 4.2.8:

Distribution of Personal Habits

S. No.	Habits	Out patients		In patients	
		No. of Cases	Percentage	No. of Cases	Percentage
1.	Alcohol	0	0%	1	5%
2.	Smoking	0	0%	1	5%
3.	Alcohol with smoking	2	10%	2	10%
4.	Non users	18	90%	16	80%

Figure 4.2.8:

Distribution of Personal Habits



Inference:

This table revealed that majority of 90% of the out patients and 80% of the In patients did not have bad habits, compared to other bad habits.

4.2.9: *Nilam:*

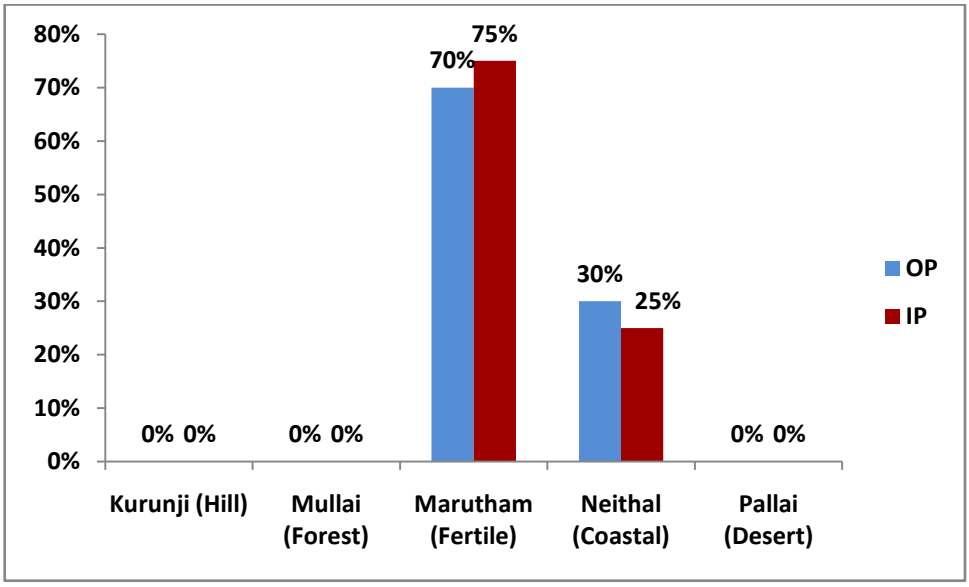
Table 4.2.9:

Distribution of *Nilam*

S. No.	*Nilam*	Out patients		In patients	
		No. of Cases	Percentage	No. of Cases	Percentage
1.	*Kurunji (Hill)*	0	0%	0	0%
2.	*Mullai (Forest)*	0	0%	0	0%
3.	*Marutham (Fertile)*	14	70%	15	75%
4.	*Neithal (Coastal)*	6	30%	5	25%
5.	*Pallai (Desert)*	0	0%	0	0%

Figure 4.2.9:

Distribution of *Nilam*



Inference:

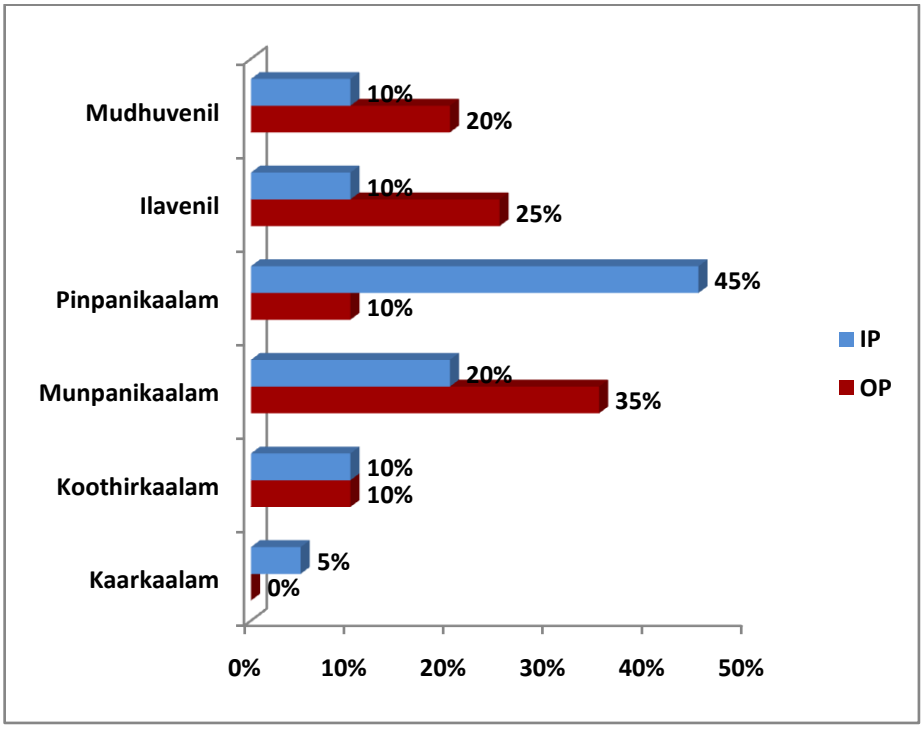
Among out patients, 70% were from *Marutham*, 30% were from *Neithal*. Among In patients, 75% were from *Marutham*, 25% were from *Neithal*.

4.2.10: *Kaalam* (Season)

Table 4.2.10:
Distribution of *Kaalam* (Season)

S. No.	*Kaalam*	Out patients		In patients	
		No. of Cases	Percentage	No. of Cases	Percentage
1.	*Kaarkaalam*	0	0%	1	5%
2.	*Koothirkaalam*	2	10%	2	10%
3.	*Munpanikaalam*	7	35%	4	20%
4.	*Pinpanikaalam*	2	10%	9	45%
5.	*Ilavenil*	5	25%	2	10%
6.	*Mudhuvenil*	4	20%	2	10%

Figure 4.2.10:
Distribution of *Kaalam* (season)



Inference:

Among 20 out patients, 35% of patients came during *Munpani kaalam* and 25% of patients came during *Ilavenil kaalam* & In patients, 45% of patients came during *Pinpani kaalam* and 20% of patients came during *Munpani kaalam*.

4.2.11: *Imporigal*

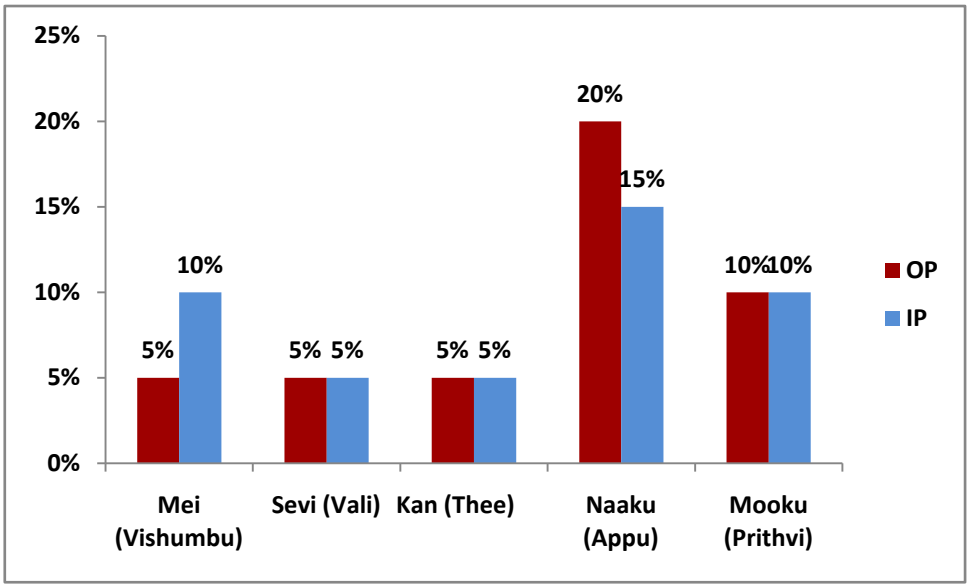
Table 4.2.11:

Distribution of *Imporigal*

S. No	*Imporigal*	Out patients		In patients	
		No. of Cases	Percentage	No. of Cases	Percentage
1.	*Mei (Vishumbu)*	1	5%	2	10%
2.	*Sevi (Vali)*	1	5%	1	5%
3.	*Kan (Thee)*	1	5%	1	5%
4.	*Naaku (Appu)*	4	20%	3	15%
5.	*Mookku (Prithvi)*	2	10%	2	10%

Figure 4.2.11:

Distribution of *Imporigal*



Inference:

Among 20 Out patients, Naaku was affected in 20%, Mei and Mooku was equally affected in 10% & among 20 In patients, Naaku,Mei and Mooku was equally affected in 10%.

4.2.12: *Kanmenthirium:*

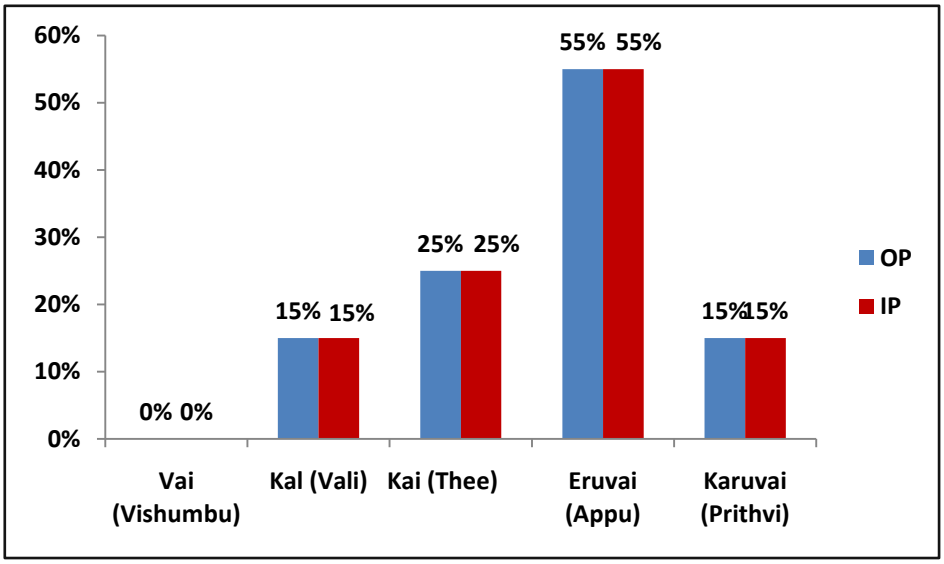
Table 4.2.12:

Distribution of *Kanmenthirium*

S. No.	*Kanmenthirium*	Out patients		In patients	
		No. of Cases	Percentage	No. of Cases	Percentage
1.	*Vai (Vishumbu)*	0	0%	1	5%
2.	*Kal (Vali)*	3	15%	6	30%
3.	*Kai (Thee)*	5	25%	6	30%
4.	*Eruvai (Appu)*	11	55%	7	35%
5.	*Karuvai (Prithvi)*	3	15%	3	15%

Figure 4.2.12:

Distribution of *Kanmenthirum*



Inference:

Among 20 Out patients, *Eruvaai* was affected in 55%, *Kai* was affected in 25% and *Karuvaai* was affected in 15% & among 20 In patients, *Eruvaai* was affected in 55%, *Kai* was affected in 25% and *Karuvaai* was affected in 15%.

4.2.13: *Uyir Thathukal*

Table 4.2.13.1:

Distribution of *Vatham*

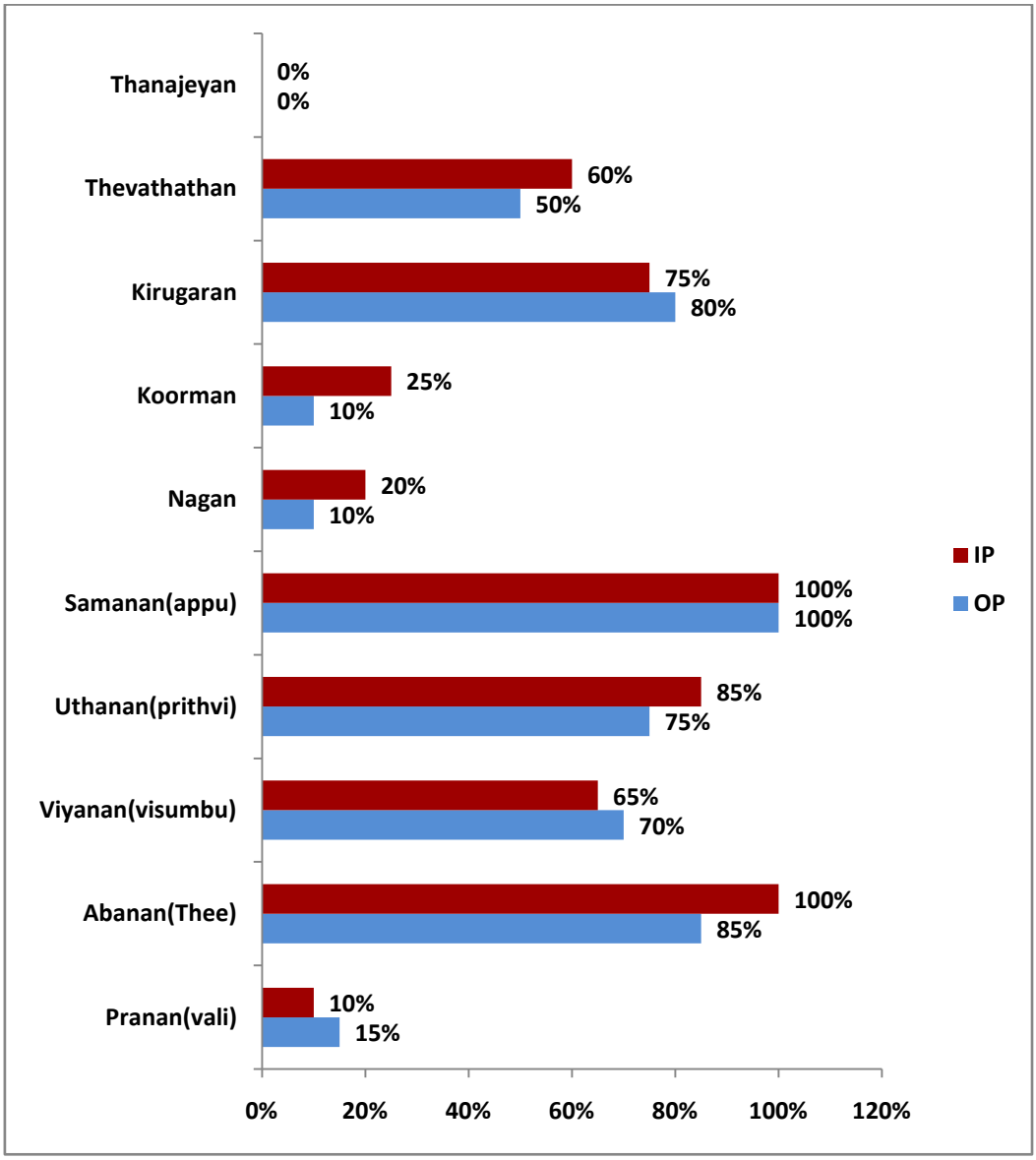
S. No	*Vatham*	Out patients		In patients	
		No. of Cases	Percentage	No. of Cases	Percentage
1.	*Pranan(vali)*	3	15%	4	10%
2.	*Abanan(Thee)*	17	85%	20	100%
3.	*Viyanan(visumbu)*	14	70%	13	65%
4.	*Uthanan(prithvi)*	15	75%	17	85%
5.	*Samanan(appu)*	20	100%	20	100%
6.	*Nagan*	2	10%	4	20%
7.	*Koorman*	2	10%	5	25%
8.	*Kirugaran*	16	80%	15	75%
9.	*Thevathathan*	10	50%	12	60%
10.	*Thanajeyan*	0	0%	0	0%

Inference:

Among 20 Out patients and 20 In patients Samanan were affected in 100%, Abanan was affected in 100% of In patients, 85% of Out patients. Whereas Uthanan was affected in 85% of In patients and 75% of Out patients, Kirukaran was affected in 80% of Out patients and 75% of In patients, Viyanan was affected in 70% of Out patients and 65% of In patients, Thevathathan was affected in 50% of Out patients 60% of In patients compared to other vayus.

Figure 4.2.13.1:

Distribution of Vatham



4.2.13.2: *Pitham*

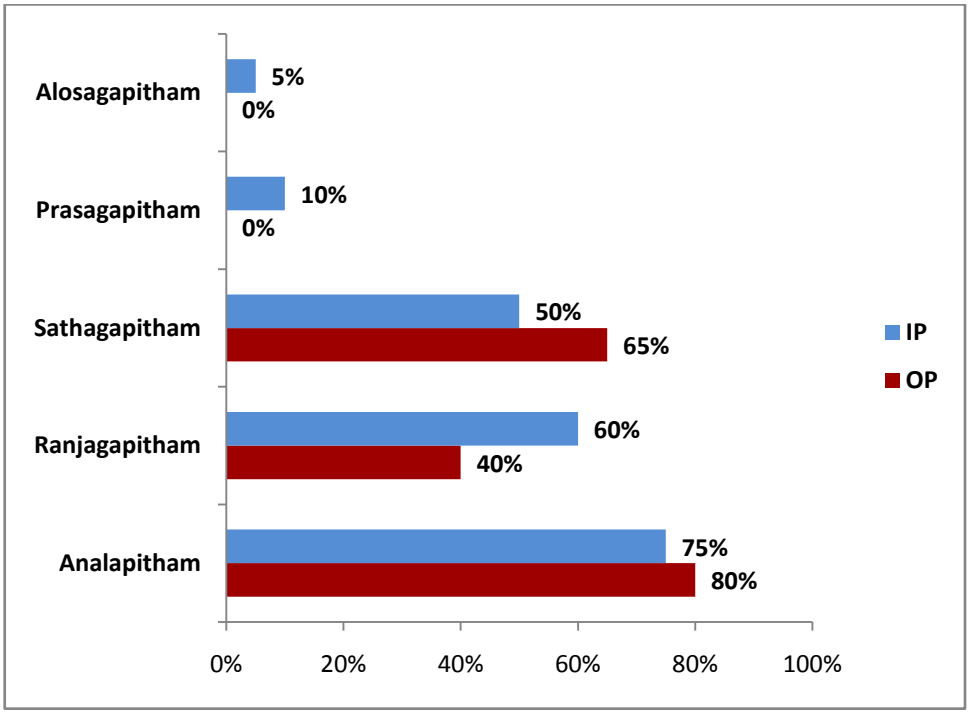
Table 4.2.13.2:

Distribution of *Pitham*

S. No	*Pitham*	Out patients		In patients	
		No. of Cases	Percentage	No. of Cases	Percentage
1.	*Analapitham*	16	80%	15	75%
2.	*Ranjagapitham*	8	40%	12	60%
3.	*Sathagapitham*	13	65%	10	50%
4.	*Prasagapitham*	0	0%	2	10%
5.	*Alosagapitham*	0	0%	1	5%

Figure 4.2.13.2:

Distribution of *Pitham*



Inference:

This table revealed that among 20 Out patients, Analapitham was affected in 80%, Sathagapitham was affected in 65%, Ranjagapitham was affected in 40%. Among 20 In patients, in Analapitham was affected in 75%, Ranjagapitham was affected in 60%, Sathagapitham was affected in 50%, Prasagapitham was affected in 10% & Alosagapitham was affected in 5%.

4.2.13.3: *Kabam*

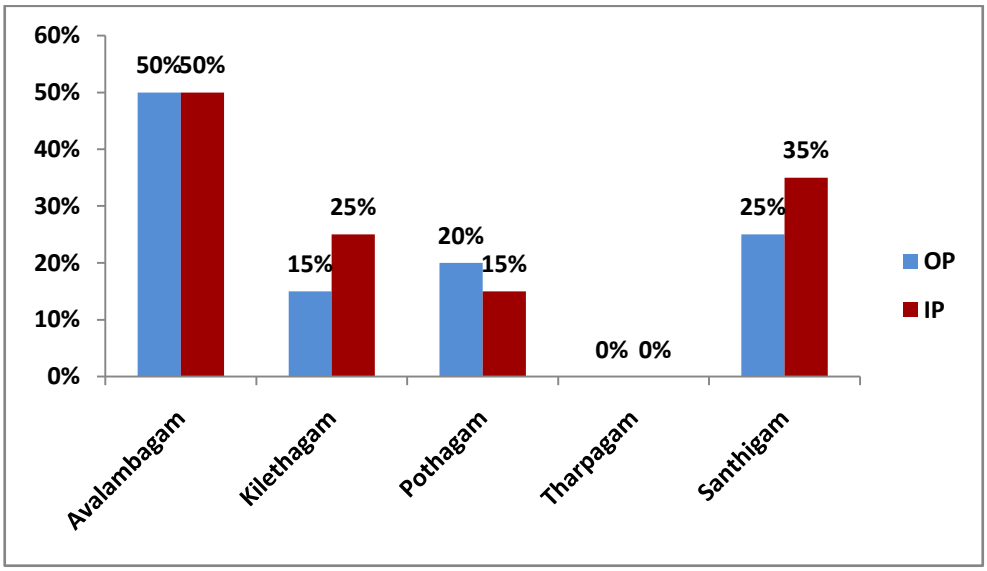
Table 4.2.13.3:

Distribution of *Kabam*

S. No	*Kabam*	Out patients		In patients	
		No. of Cases	Percentage	No. of Cases	Percentage
1.	*Avalambagam*	10	50%	10	50%
2.	*Kilethagam*	3	15%	5	25%
3.	*Pothagam*	4	20%	3	15%
4.	*Tharpagam*	0	0%	0	0%
5.	*Santhigam*	5	25%	7	35%

Figure 4.2.13.3:

Distribution of *Kabam*



Inference:

This table revealed that majority 50% of out patients and In patients, *Avalambagam* was affected, In 25% of Out patients and 35% of In patients *Santhigam* was affected, In 15% of Out patients and 25% of In patients *Kilethagam* was affected & In 20% of Out patients and 15% of In patients *Pothagam* was affected.

4.2.14: *Ezhu Udarkattukal*

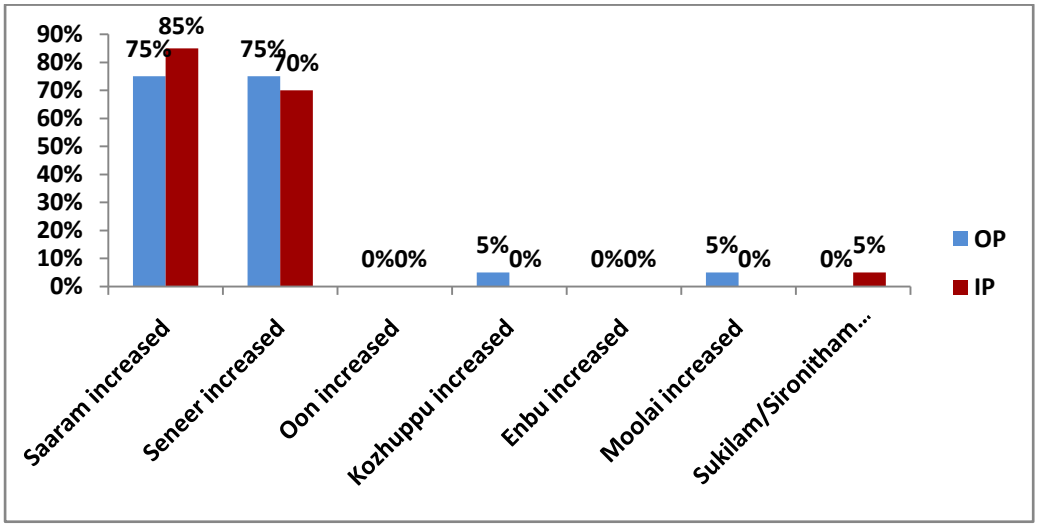
Table 4.2.14.1:

***Ezhu Udarkattukal* (Increased)**

S. No.	*Ezhu Udarkattukal*	Out patients		In patients	
		No. of Cases	Percentage	No. of Cases	Percentage
1.	*Saaram* increased	15	75%	17	85%
2.	*Seneer* increased	15	75%	14	70%
3.	*Oon* increased	0	0%	0	0%
4.	*Kozhuppu* increased	1	5%	0	0%
5.	*Enbu* increased	0	0%	0	0%
6.	*Moolai* increased	1	5%	0	0%
7.	*Sukkilam / Suronitham* increased	0	0%	1	5%

Figure 4.2.14.1:

***Ezhu Udarkattukal* (Increased)**



Inference:

This table revealed that *Saaram* was increased in 75% of Out patients and 85% of In patients & *Seneer* was increased in 75% of Out patients and 70% of In patients.

4.2.14.2: *Ezhu Udarkattukal* (Decreased)

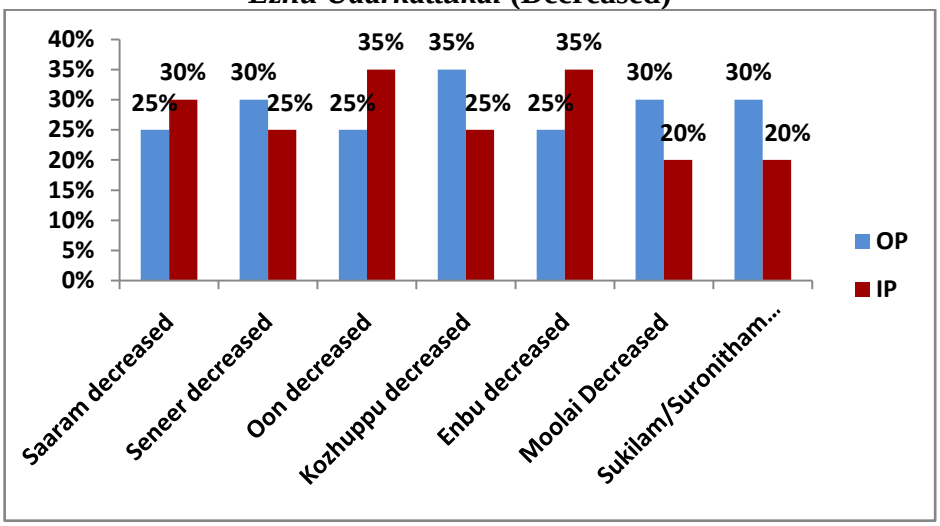
Table 4.2.14.2:

***Ezhu Udarkattukal* (Decreased)**

S. No.	*Ezhu Udarkattukal*	Out patients		In patients	
		No. of Cases	Percentage	No. of Cases	Percentage
1.	*Saaram* decreased	5	25%	6	30%
2.	*Seneer* decreased	6	30%	5	25%
3.	*Oon* decreased	5	25%	7	35%
4.	*Kozhuppu* decreased	7	35%	5	25%
5.	*Enbu* decreased	5	25%	7	35%
6.	*Moolai* decreased	6	30%	4	20%
7.	*Sukkilam / Suronitham* decreased	6	30%	4	20%

Figure 4.2.14.2:

***Ezhu Udarkattukal* (Decreased)**



Inference:

Among Out patients *Saram* was decreased in 25%, *Seneer* was decreased in 30%, *Oon* was decreased in 25%, *Kozhuppu* was decreased in 35%, *Enbu* was decreased in 25%, *Moolai* was decreased in 30% & *Sukkilam/Suronitham* was decreased in 30%. Whereas In patients *Saram* was decreased in 30%, *Seneer* was decreased in 25%, *Oon* was decreased in 35%, *Kozhuppu* was decreased in 25%, *Enbu* was decreased in 35%, *Moolai* was decreased in 20% & *Sukkilam/Suronitham* was decreased in 20%.

4.2.15: *Kosangal*

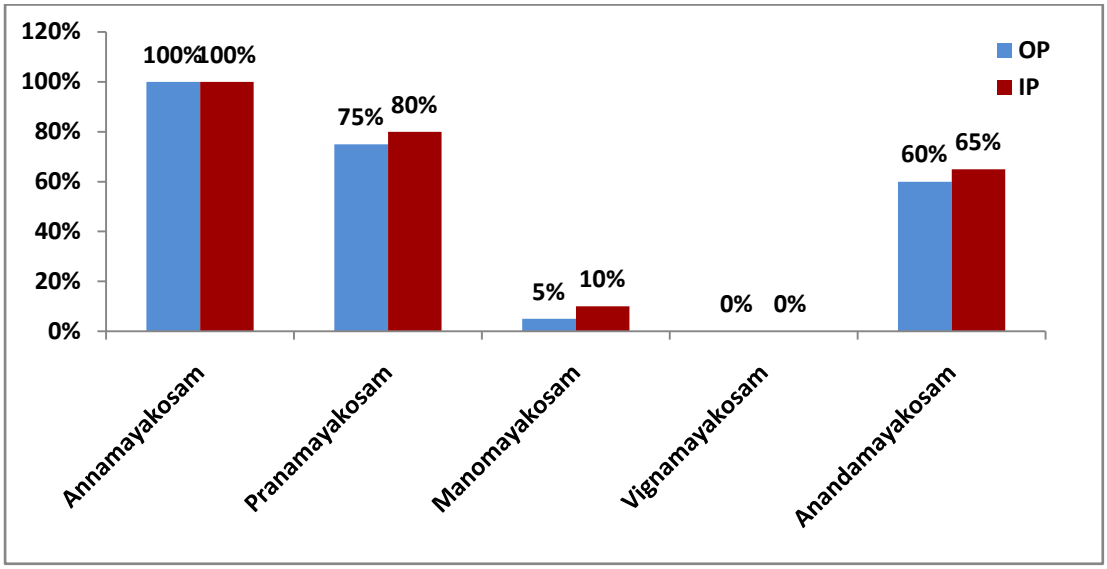
Table 4.2.15:

Distribution of *Kosangal*

S. No.	*Kosangal*	Out patients		In patients	
		No. of Cases	Percentage	No. of Cases	Percentage
1.	*Annamayakosam*	20	100%	20	100%
2.	*Pranamayakosam*	15	75%	16	80%
3.	*Manomayakosam*	1	5%	2	10%
4.	*Vignamayakosam*	0	0%	2	0%
5.	*Anandamayakosam*	12	60%	13	65%

Figure 4.2.15:

Distribution of *Kosangal*



Inference:

This table revealed that *Annamayakosam* was affected in all of the Out patients and In patients, *Pranamayakosam* was affected in 75% of Out patients and 80% of In patients, *Ananthamayakosam* was affected in 60% of Out patients and 65% of In patients & *Pranamayakosam* was affected in few cases.

4.2.16.1: *Envagai thervugal - Naadi*

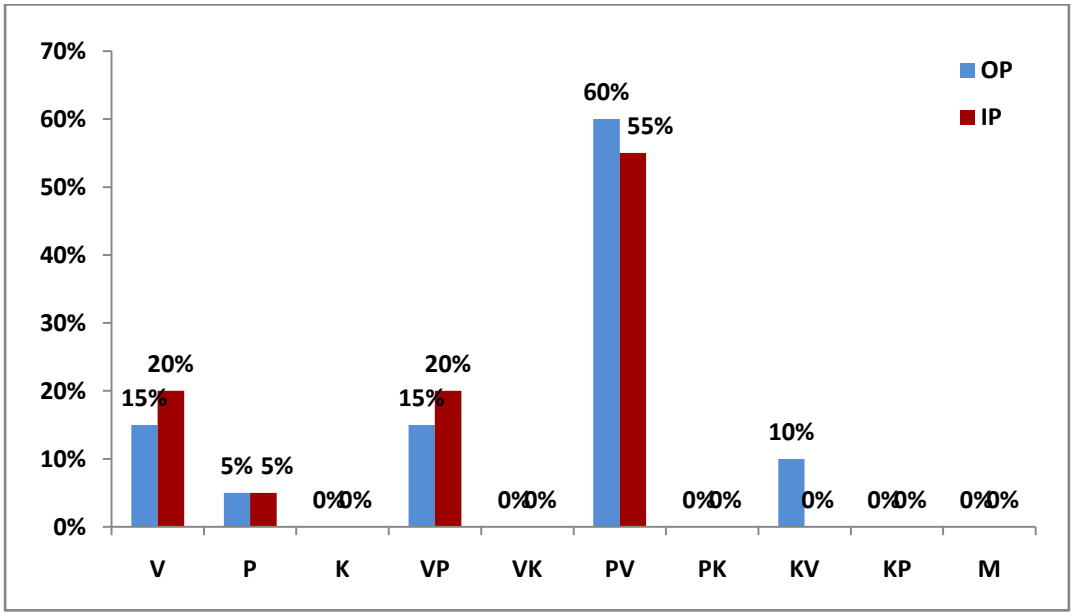
Table 4.2.16.1:

Distribution of *Naadi*

S. No.	*Naadi*	Out patients		In patients	
		No. of Cases	Percentage	No. of Cases	Percentage
1.	*Vaatha naadi (V)*	3	15%	4	20%
2.	*Pitha Naadi (P)*	1	5%	1	5%
3.	*Kaba naadi (K)*	0	0%	0	0%
4.	*Vaatha pitha Naadi(VP)*	3	15%	4	20%
5.	*Vaatha kaba naadi(VK)*	0	0%	0	0%
6.	*PithaVaatha Naadi(PV)*	12	60%	11	55%
7.	*Pitha Kaba Naadi(PK)*	0	0%	0	0%
8.	*Kaba Vaatha naadi(KV)*	2	10%	0	0%
9.	*Kaba Pitha Naadi(KP)*	0	0%	0	0%
10.	*Mukkutram Naadi (M)*	0	0%	0	0%

Figure 4.2.16.1:

Distribution of *Naadi*



Inference:

This table revealed that 60% of Out patients and 55% of In patients were with *Pitha vaatha naadi*. 20% of In patients were with *Vatha naadi*, 20% of In patients were with *Vathapitha naadi*, 15% of Out patients were with *Vatha naadi* and 15% of Out patients were with *Vathapitha naadi*.

4.2.16.2: *Sparism, Naa, Niram, Mozhi, Vizhi, Malam*

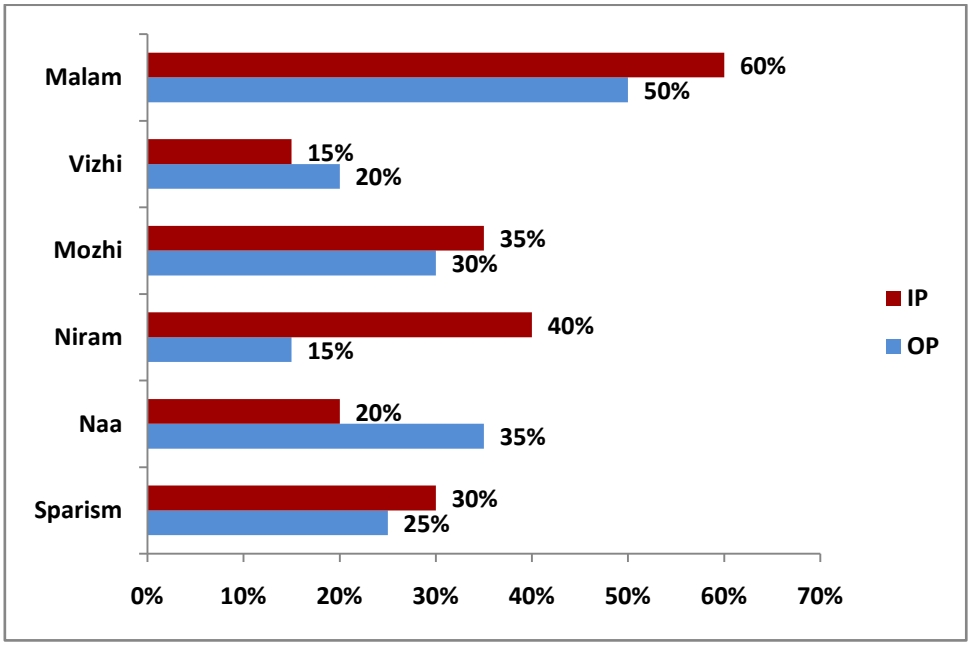
Table 4.2.16.2:

Distribution of *Sparism, Naa, Niram, Mozhi, Vizhi,Malam*

S. No.		Out patients		In patients	
		No. of Cases	Percentage	No. of Cases	Percentage
1.	*Sparism*	5	25%	6	30%
2.	*Naa*	7	35%	4	20%
3.	*Niram*	3	15%	8	40%
4.	*Mozhi*	6	30%	7	35%
5.	*Vizhi*	4	20%	3	15%
6.	*Malam*	10	50%	12	60%

Figure 4.2.16.2:

Distribution of *Sparism, Naa, Niram, Mozhi, Vizhi, Malam*



Inference:

Among 40 patients *Malam* was affected in 50% of Out patients and 60% of In patients, *Sparism* was affected in 25% of Outpatients and 30% of In patients, *Naa* was affected in 35% of Out patients and 20% of In patients, *Niram* was affected in 15% of Out patients and 40% of In patients, *Mozhi* was affected in 30% of Out patients & 35% of In patients & *Vizhi* was affected in 20% of Out patients and 15% of In patients.

4.2.16.3: *Neerkuri*

4.2.16.3.1: *Neer -Niram*

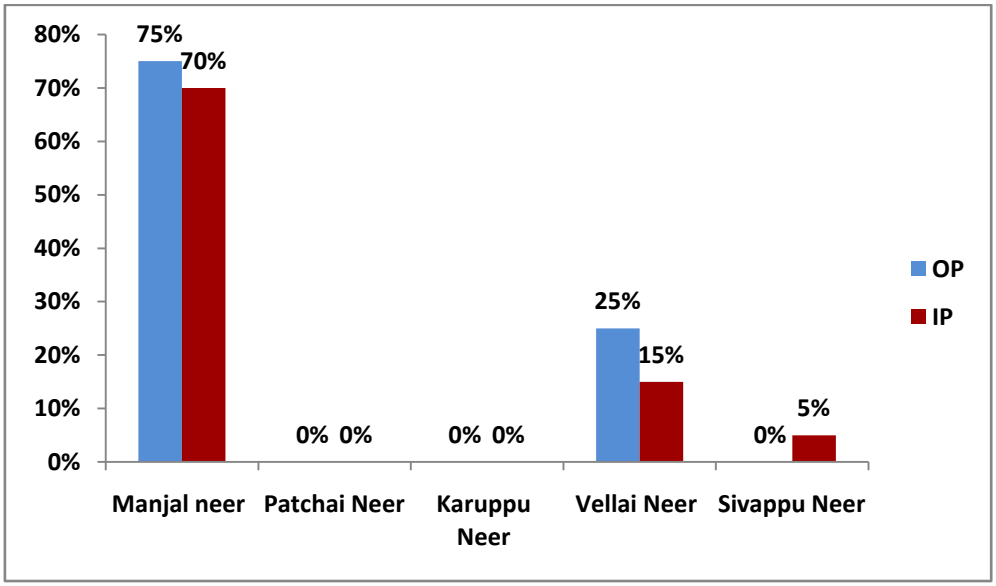
Table 4.2.16.3.1:

Distribution of *Neer- Niram*

S. No.	*Niram*	Out patients		In patients	
		No. of Cases	Percentage	No. of Cases	Percentage
1.	*Manjal neer*	15	75%	16	70%
2.	*Patchai Neer*	0	0%	0	0%
3.	*Karuppu Neer*	0	0%	0	0%
4.	*Vellai Neer*	5	25%	3	15%
5.	*Sivappu Neer*	0	0%	1	5%

Figure 4.2.16.3.1:

Distribution of Neer Niram



Inference:

Among 40 patients 75% of Outpatients and 70% of In patients were shown *Manjal neer*, *Vellai neer* was shown in 25% of Out patients and 15% of In patients. Few cases were shown *Sivappu neer*.

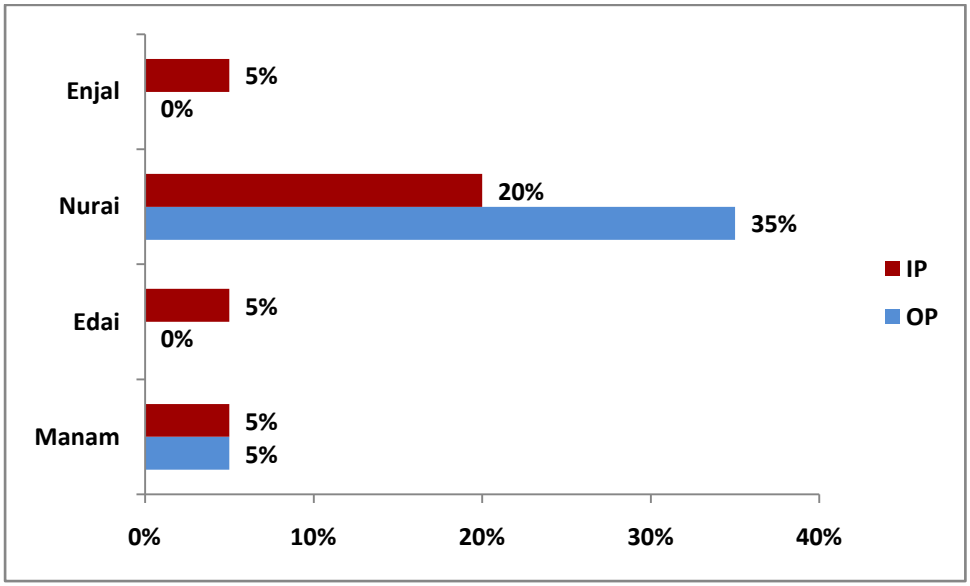
4.2.16.3.2: *Neer-Manam, Edai, Nurai, Enjal*

Table 4.2.16.3.2:
Distribution of *Manam,Edai,Nurai,Enjal*

S. No.	*Neer*	Out patients		In patients	
		No.of Cases	Percentage	No.of Cases	Percentage
1.	*Manam*	1	5%	1	5%
2.	*Edai*	0	0%	1	5%
3.	*Nurai*	7	35%	4	20%
4.	*Enjal*	0	0%	1	5%

Figure 4.2.16.3.2:

Distribution of *Manam, Edai, Nurai, Enjal*



Inference:

Among 40 patients Manam was affected in 5% of Out patients and In patients, Edai was affected in 5% of In patients. Nurai was affected in 35% of Out patients and 20% of In patients.

4.2.17: *Neikuri*

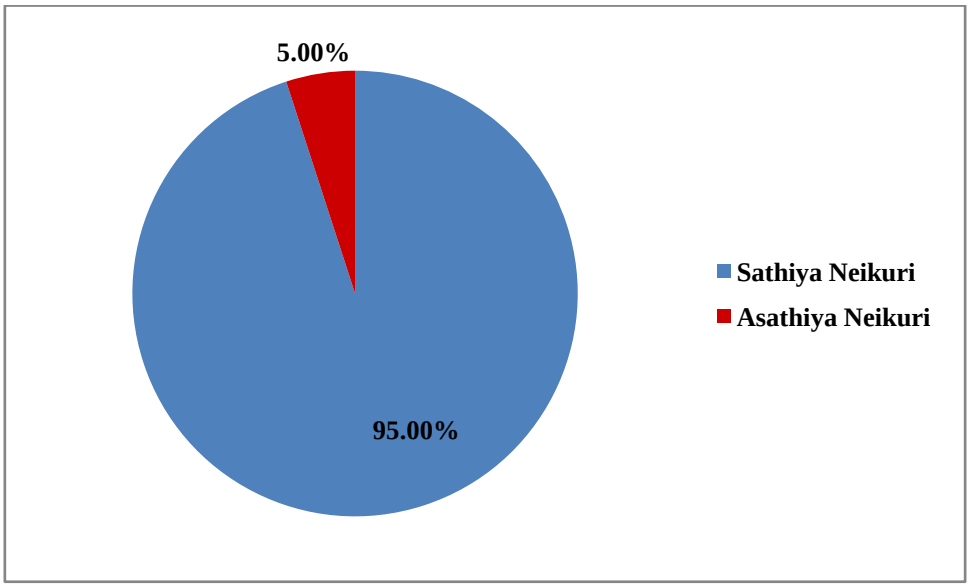
Table 4.2.17:

Distribution of *Neikuri*

S.No.	*Neikuri*	Frequency	Percentage
1.	*Sathiya Neikuri*	38	95.00%
2.	*Asathiya Neikuri*	2	5.00%
3.	Total	40	100.00%

Figure 4.2.17:

Distribution of *Neikuri*



Inference:

Among 40 patients 95.00% were showing *Sathiya Neikuri* and 5.00% were showing *Asathiya Neikuri*.

4.2.18: Habits of controlling *14 Vegangal*

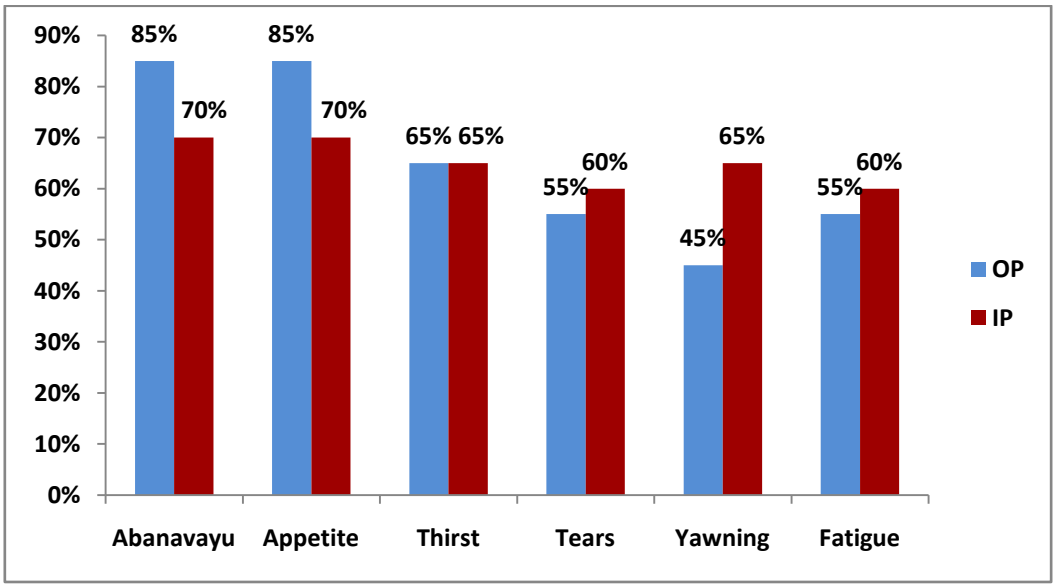
Table 4.2.18:

Distribution of *14 Vegangal*

S. No.	*14 Vegangal*	Out patients		In patients	
		No. of Cases	Percentage	No. of Cases	Percentage
1.	*Abanavayu*	17	85%	14	70%
2.	*Appetite*	17	85%	14	70%
3.	*Thirst*	13	65%	13	65%
4.	*Tears*	11	55%	12	60%
5.	*Yawning*	9	45%	13	65%
6.	*Fatigue*	11	55%	12	60%

Table 4.2.18:

Distribution of *14 vegangal*



Inference:

Among 20 Out patients 85% were controlled the *Abanavayu* and Appetite, 65% were controlled the Thirst, 55% were controlled the Tears & Fatigue, 45% were controlled the Yawning. Among 20 In patients 70% were controlled the *Abanavayu* and Appetite, 65% were controlled the Thirst & Yawning, 60% were controlled the Tears & Fatigue.

4.2.19: *Udarthee*

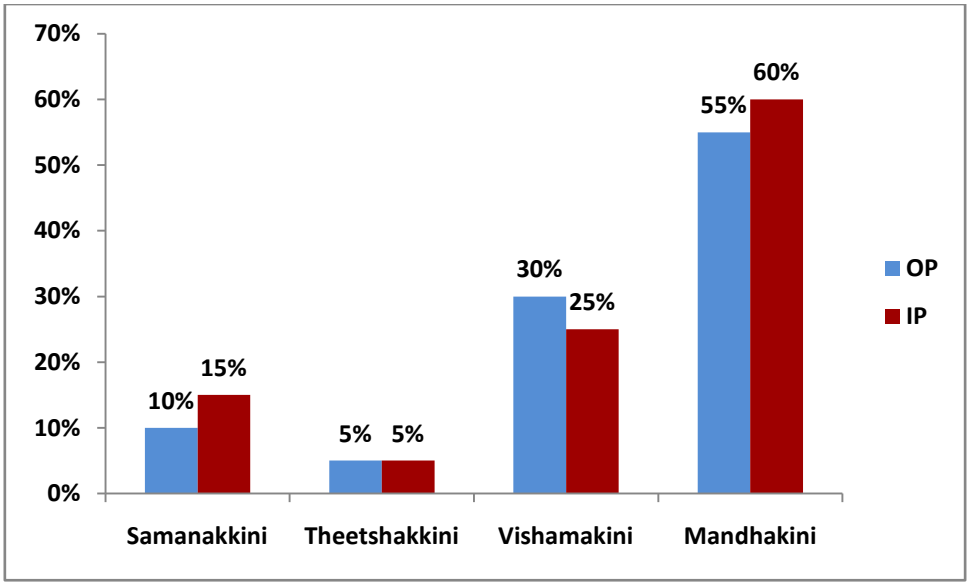
Table 4.2.19:

Distribution of *Udarthee*

S. No.	*Udarthee*	Out patients		In patients	
		No. Of cases	Percentage	No. Of cases	Percentage
1.	*Samanakkini*	2	10%	2	15%
2.	*Theekshanakkini*	1	5%	1	5%
3.	*Vishamakini*	6	30%	5	25%
4.	*Mandhakini*	11	55%	12	60%

Figure 4.2.19:

Distribution of *Udarthee*



Inference:

Among 20 Out patients, 10% of patients were with *Samanakkini*, 5% of patients were with *Theekshanakkini*, 55% of patients were with *Mandhakkini* and 30% of patients were with *Vishamakkini*. Among 20 In patients, 15% of patients were with *Samanakkini*, 5% of patients were with *Theekshanakkini*, 60% of patients were with *Mandhakkini* and 25% of patients were with *Vishamakkini*.

4.2.20: *Thegi Ilakkanam*

Table 4.2.20:

Distribution of *Thegi Ilakkanam*

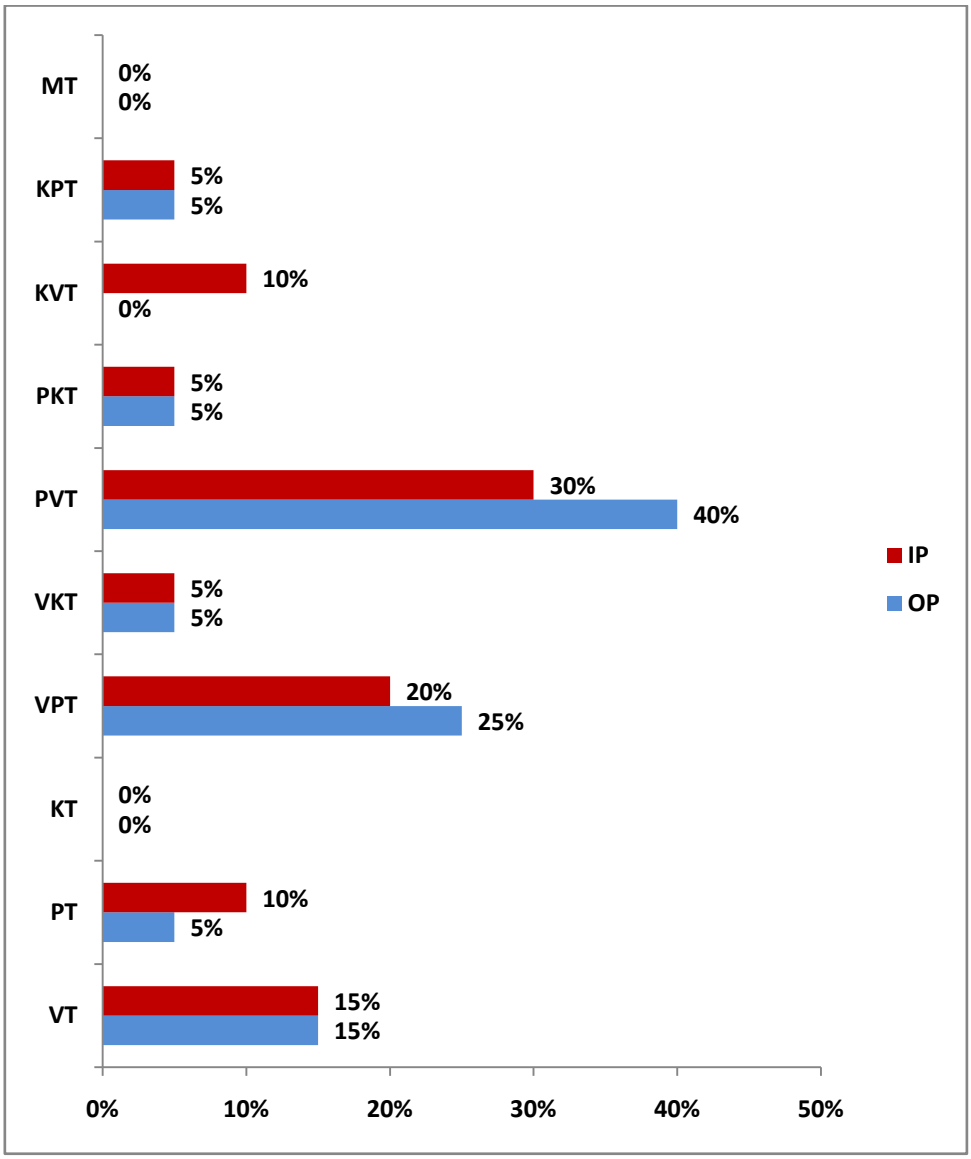
S. No	*Naadi*	Out patients		In patients	
		No. of Cases	Percentage	No. of Cases	Percentage
1.	*Vaatha Thegi (VT)*	3	15%	3	15%
2.	*Pitha Thegi (PT)*	1	5%	2	10%
3.	*Kaba Thegi (KT)*	0	0%	0	0%
4.	*Vaathapitha Thegi (VPT)*	5	25%	5	25%
5.	*Vaathakaba Thegi (VKT)*	1	5%	1	5%
6.	*PithaVaatha Thegi (PVT)*	8	40%	7	35%
7.	*Pitha Kaba Thegi (PKT)*	1	5%	1	5%
8.	*KabaVaathaThegi (KVT)*	0	0%	1	5%
9.	*Kaba Pitha Thegi (KPT)*	1	5%	0	0%
10.	*Mukkutra Thegi (MT)*	0	0%	0	0%

Inference:

This table revealed that, Out patients 15% and In patients 15% were *Vaatha Thegi*. Out patients 5% & In patients 10% were *Pitha Thegi*. 25% Out patients and 25% In patients were *Vaatha Pitha Thegi.* 5% Out patients and 5% In patients were *Vaatha Kaba Thegi*. 40% Out patients & 35% In patients were *Pitha Vaatha Thegi*. 5% Out patients & 5% Inpatients were *Pitha Kaba Thegi*. 5% Inpatients were *Kaba Vaatha Thegi*. 5% Out patients were *Kaba Pitha Thegi.*

Figure 4.2.20:

Distribution of *Thegi Ilakkanam*



4.2.21: *Gunam*

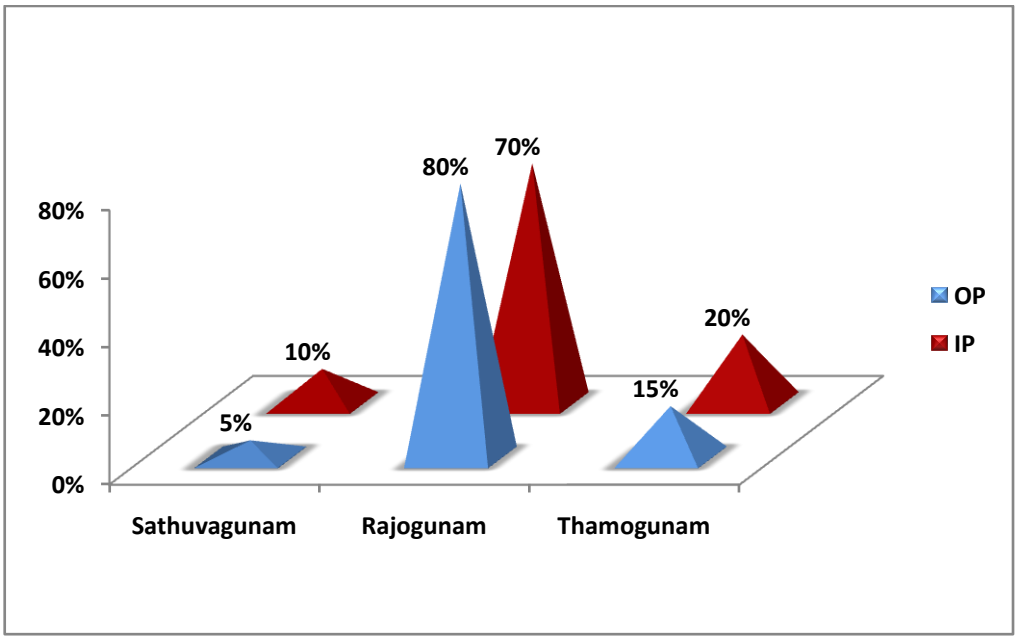
Table 4.2.21:

Distribution of *Gunam*

S. No.	*Gunam*	Out patients		In patients	
		No. of Cases	Percentage	No. of Cases	Percentage
1	*Sathuvagunam*	1	5%	2	10%
2	*Rajogunam*	16	80%	14	70%
3	*Thamogunam*	3	15%	4	20%

Figure 4.2.21:

Distribution of *Gunam*



Inference:

Among Out patients, 80% were with *Rajogunam*, 15% were with *Thamogunam* and 5% were with *Sathuvagunam*.

Among In patients, 70% were with *Rajogunam*, 10% were with *Sathuvagunam* and 20% were with *Thamogunam*.

4.2.22: *Manikadainool*

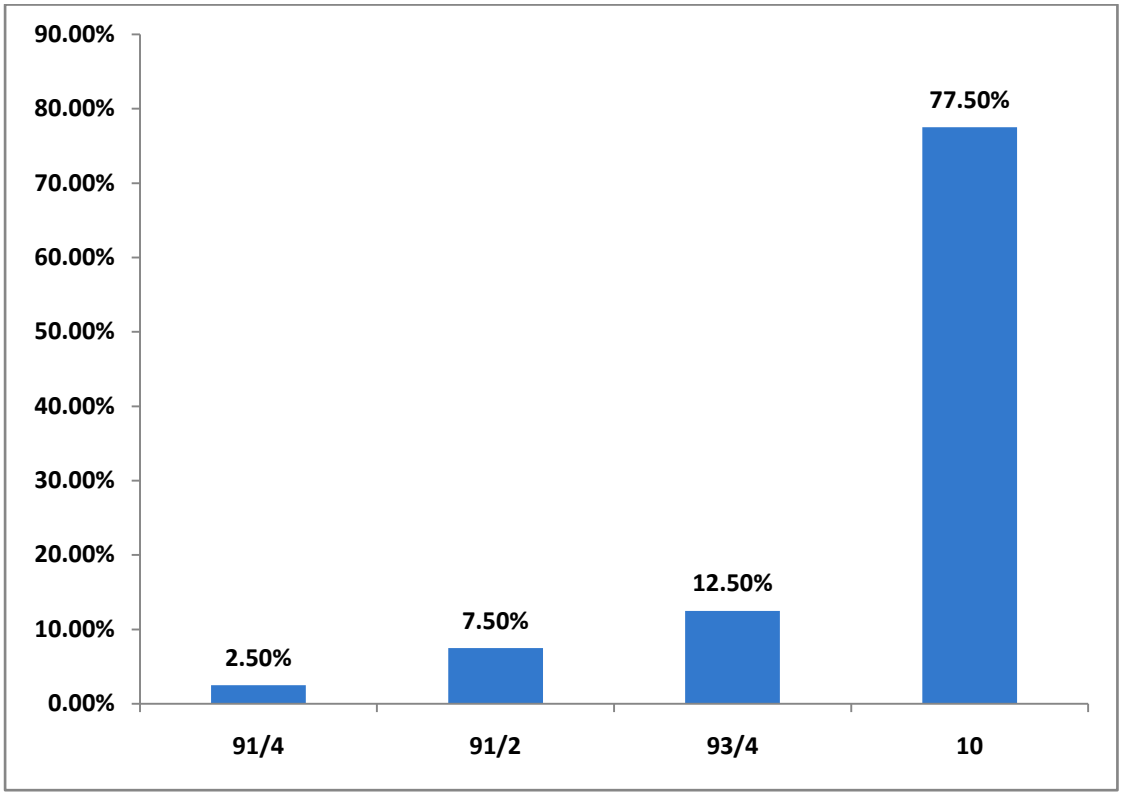
Table 4.2.22:

Distribution of *Manikadainool*

S. No.	Virarkadai	Frequency	Percentage
1.	9 ¼	1	2.50%
2.	9 ½	3	7.50%
3.	9 ¾	5	12.50%
4.	10	31	77.50%
5.	Total	40	100.00%

Figure 4.2.22:

Distribution of Manikadainool



Inference:

Among 40 patients 2.5% were in 9¼ Virarkadai, 7.5% were in 9½ Virarkadai, 12.5% were in 9¾ Virarkadai and 77.5% were in 10 Virarkadai.

4.2.23: Clinical symptoms before (Visit 1) and after (Visit 5) treatment

Table 4.2.23:

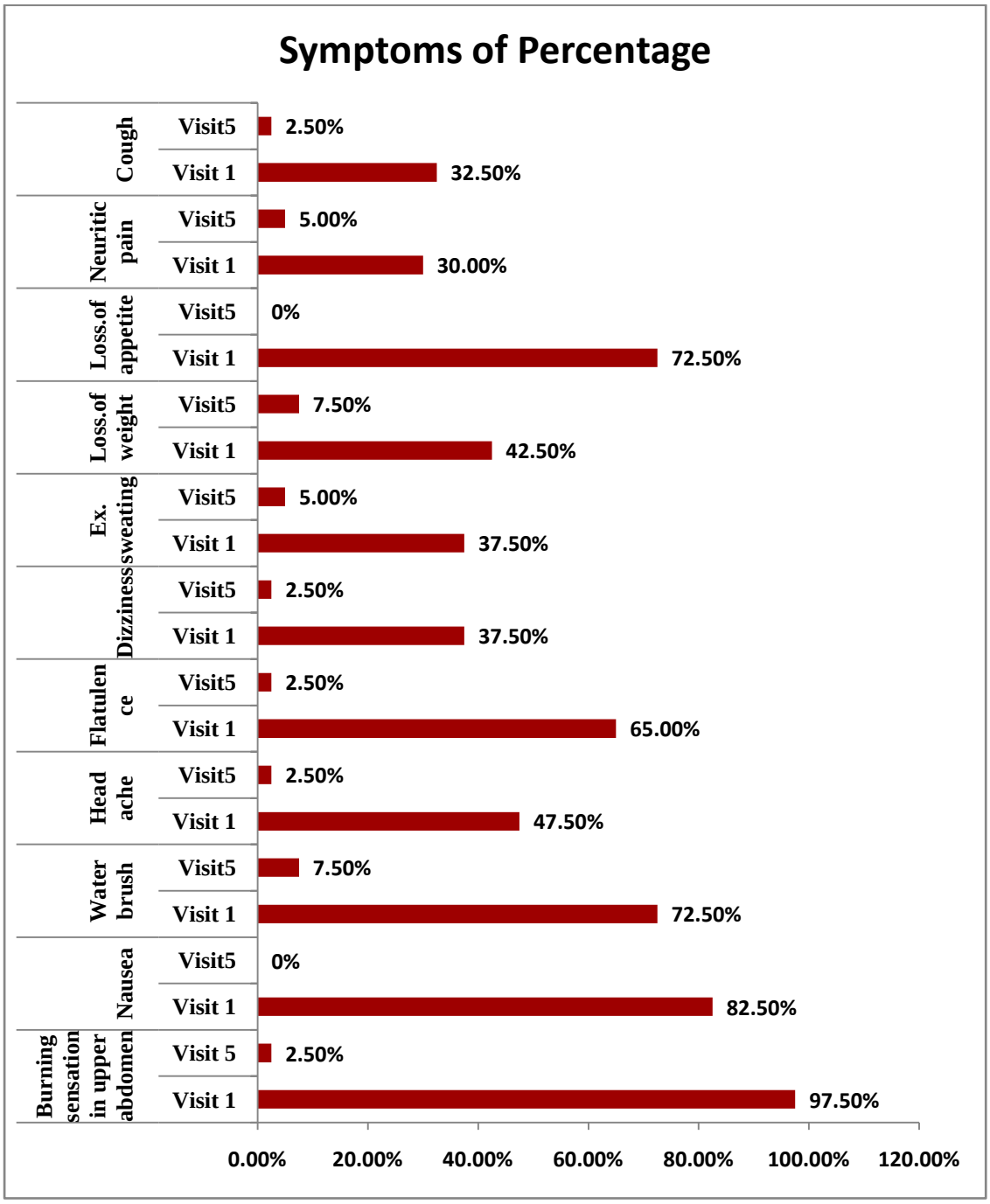
Distribution of Clinical symptoms before (Visit 1) and after (Visit 5) treatment

Symptoms		No. Of Cases	Percentage
Burning sensation in upper abdomen	Visit 1	39	97.5
	Visit 5	1	2.5
Nausea	Visit 1	33	82.5
	Visit 5	0	0
Water brush	Visit 1	29	72.5
	Visit 5	3	7.5
Head ache	Visit 1	19	47.5
	Visit 5	1	2.5
Flatulence	Visit 1	26	65
	Visit 5	1	2.5
Dizziness	Visit 1	15	37.5
	Visit 5	1	2.5
Ex. Sweating	Visit 1	15	37.5
	Visit 5	2	5
Loss.of weight	Visit 1	17	42.5
	Visit 5	3	7.5
Loss.of appetite	Visit 1	29	72.5
	Visit 5	0	0
Neuritic pain	Visit 1	12	30
	Visit 5	2	5
Cough	Visit 1	13	32.5
	Visit 5	1	2.5

All the 40 patients showed that the significant prognosis in Visit 5 based on the evaluation of symptoms.

Figure 4.2.23:

Distribution of Clinical symptoms before (visit 1) and after treatment (visit 5)



4.2.24: Grade before and after treatment

Table 4.2.24:

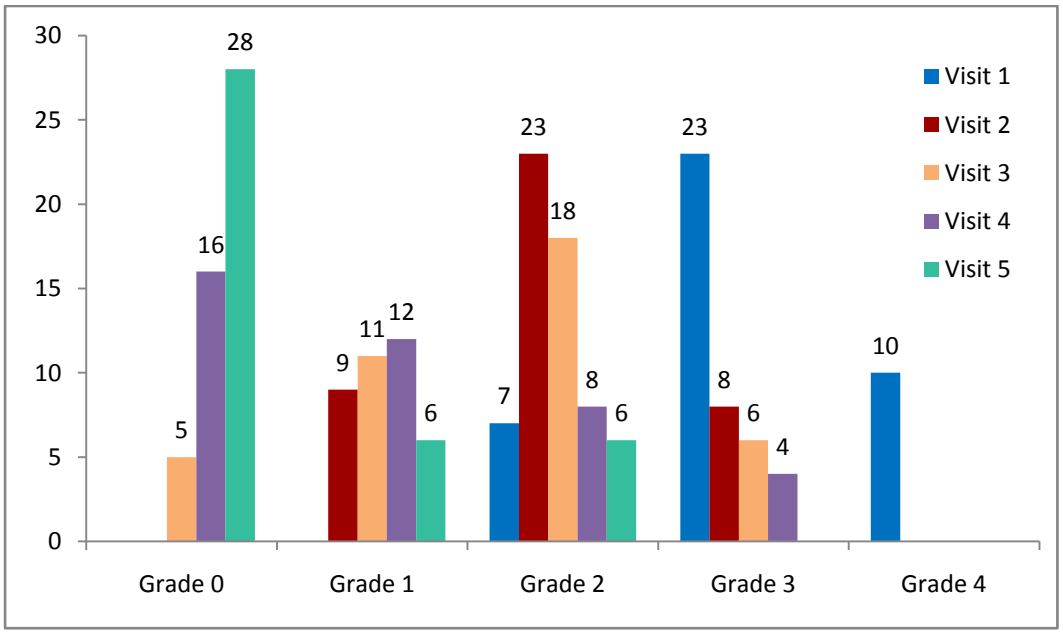
Distribution of Grade (Visit 1- Visit 5) (BT-AT)

S. No.		Grade 0	Grade 1	Grade 2	Grade 3	Grade 4
1.	Visit 1			7	23	10
2.	Visit 2		9	23	8	
3.	Visit 3	5	11	18	6	
4.	Visit 4	16	12	8	4	
5.	Visit 5	28	6	6		

Inference:

In Visit 1 Grade 2 was in 7 patients, Grade 3 was in 23 patients, Grade 4 was in 10 patients. In Visit 2 Grade was 1 in 9 patients, Grade 2 was in 23 patients, Grade 3 was in 8 patients. In Visit 3 Grade 0 was in 5 patients, Grade 1 was in 11 patients, Grade 2 was in 18 patients, and Grade 3 was in 6 patients. In Visit 4 Grade 0 was in 16 patients, Grade 1 was in 12 patients, Grade 2 was in 8 patients, and Grade 3 was in 4 patients. In Visit 5 Grade 0 was in 28 patients, Grade 1 was in 6 patients, Grade 2 was in 6 patients.

Figure 4.2.24: Distribution of Grade (Visit 1- Visit 5) (BT-AT)



Grade: 0 - Clinically cured - CAS=0-5; Grade: 1 - Clinically well improved-CAS=6-10; Grade: 2 - Marginal clinical improvement - CAS=11-40; Grade: 3 - Mild clinical improvement - CAS=41-70; Grade: 4 - No changes clinically - CAS ≥70

4.2.25: Difference analysis for prognosis

Table 4.2.25: Significance between CAS and outcome (Visit1& Visit5)

	No.	Mean	Std. Deviation	t value	P value
Visit 1	40	3.07	0.656	33.861	<0.0001
visit 5	40	0.45	0.749		

(Paired "t" Test)

Depending upon P value the prognosis is Significant.

CHAPTER- V

DISCUSSION

5.1 The recruited patient's data shows

1. More prevalence in Male. The Male to Female ratio is **1.6:1**.
2. Most of patients belong to *Pitha Kaalam* (34-66yrs).
3. Commonly affected were Employees (65%) and those having irregular dietary time habits.
4. Mostly *Marutham* nilam people were affected in Gunma noi(72.5%)
5. More prevalence in *Pinpani Kaalam*, because of *Kabam* (*Thannilai Valarchi*) which leads to altered Pitham.
6. In *Imporigal*, Naaku was affected in 17.5%, which may be due to affected taste perception.
7. In *Kanmendhiriyam*, Eruvai was affected in 45%. Most of them had loose stool with increased flatus.
8. Uyir Thathukkal affection status were as follows;
    i. Vatham – 100% Samanan (due to digestive disturbances) affected followed by Abanan 92.5% (presence of loose stools, flatus) & then by Udhanan 80% (stagnation of digestive matters causing perverted appetite)
    ii. Pitham – Anarpitham (due to digestive disturbances) affected in 77.5%
    iii. Kabam – Avalambagam (due to imbalance in other 4 Iyam's) affected in 50%, followed by Santhigam 30% (Restriction in movement of joints).
9. In Udar Thathukkal,

    Table 4.2.14.1 & Table 4.2.14.2 showed,

    i. Saaram increased up to 80% and followed by Seneer 72.5%,
    ii. Remaining 5 thathus decreased (this may be due to disturbances in Abanan & Samanan).
10. In Kosangal, Annamayakosam affected in all patients 100%, followed by Pranamaya Kosam (77.5%) & Aanandhamaya Kosam (62.5%).

11. Envagai Thervu
    i. Naadi – Pitha Vaatha naadi 57.5%, Vaatha Pitha and Vatha naadi 17.5% were recorded.
    ii. Malam 55%, Mozhi 32.5% was affected. Remaining was not affected significantly.
    iii. Neer – Niram – Manjal 72.5%
    Nurai – 27.5%.
12. Saathiya Neikuri 95%, Asaathiya Neikuri 5% was recorded.
13. Among 14 Vegangal, Abanavayu & Appetite were voluntarily controlled by 77.5% patients.
14. Udarthee was Mandhakkini in 57.5% & Vishamakkini in 27.5%.
15. Erigunmam was Common in Pitha Vatha thegi 35%.
16. Common in Rajo Gunam 77.5%, followed by Thamo Gunam 17.5%.
17. In Manikadainool, 10 Virarkadai in 77.5%.
18. Grades were gradually decreased in visit 5.
19. Statistically significant ($p < 0.0001$) between Visit 1 & Visit 5 using 'Paired t test'.

CHAPTER- VI

THE SUMMARY & CONCLUSION

(Summation)

The 40 patients with CAS Grade ≤ 2 were allocated to treatment with Vellarugu Chooranam 2 gm Bd with warm water for 30 days. No adverse reaction was found. Males also had more or less equal preponderance with females. Pitha Kaalam (34 -66yrs) had more prevalence. Due to modernisation and industrialitation, prevalence of Eri Gunmam has been emerging in Marutham too. The increased Saaram and Seneer doesn't get distributed to other Udar kattugal may be due to disturbed functioning of Abanan & Samanan. Annamaya Kosam commonly affected. Rajo Gunam has high prevalence followed by Thammo Gunam. Mandhakkini may be due to voluntarily controlling of reflexes (14 vegangal noted in all patients), which may be the risk factor for devolping Eri Gunmam. Vitation of Pitham resulted in disturbed Vaatham was noted. For the management, the Vellarugu Chooranam having the taste of **Kaippu (Valli + Aakaayam)** works well. The Preclinical data add an account for anti ulcer activity. The study showed the clinical efficacy (Grade, p value<0.0001) of Vellarugu Chooranam is clinically significant, which was evaluated by trial. This study gives immense data for treating and preventing the Eri Gunmam & shows new arena for further research.

From my dissertation work, *Eri Gunmam* may be defined as a disease in *Pitha sthanam* due to altered Vaatham & Pitham (Thee) which in turn may be due to Controlled reflexes(Vatham).On the basis of Suvai, Vellarugu Chooranam the being a combination Kaippu, leads to good prognosis.

From the Preclinical studies,

1. Biochemical studies shows the presence of
    - *Calcium, Sulphate, Chloride, Starch*
    - *Ferrous iron, unsaturated compound, Amino acid*.
2. Phytochemical studies show the presence of *Flavanoids, alkaloids, phytosterols, tannins, carbohydrates and glycosides, Lignin, Saponin.*

3. Anti- Microbial activity,

   Showed that *Vellarugu Chooranam* has the anti microbial activity against *staphylococcus aureus, bacillus Subtilis, klebsilla pneumonia and E-coli.*

4. The Pharmacological study has confirmed the significant effect of Anti-ulcer activity.
5. No acute and subacute toxicity were observed in any other group of animals, at the maximum recomputed dose level of 2gm. *Vellarugu chooranam* has not produced liver and other organ damage.
6. Based on Clinical Assessment Score, *Vellarugu Chooranam* was found to be highly effective for *Eri Gunmam.*

CASE SHEET OF 20 IN PARENTS TREATED FOR ERI GUNMAM

S.NO	IPD.NO	NAME	AGE	SEX	DOA	DOD	NO.OF DAYS TREATED		RESULT
							IP	OP	
1.	2015	NAGA ARJUN	27	M	6/8/2018	20/8/2018	15	15	GOOD
2.	2049	PARI POORANAM	43	F	10/8/2018	20/9/2018	42	-	GOOD
3.	2541	CHANDHIRA	58	F	8/10/2018	8/11/2018	30	-	GOOD
4.	3022	VELLATHAI	60	F	10/12/2018	31/12/2018	22	8	MODERATE
5.	3065	ESSAKKI MUTHU	29	M	13/12/2018	11/01/2019	30	-	GOOD
6.	3101	SELVI	56	F	18/12/2018	17/01/2019	30	-	GOOD
7.	57	SANTHANA MARIMUTHU	42	M	14/01/2019	12/02/2019	30	-	GOOD
8.	94	SWARNAM	60	F	19/01/2019	08/02/2019	21	9	MODERATE
9.	363	PETCHIYAMMAL	55	F	14/02/2019	13/03/2019	30	-	GOOD
10.	400	KALANGIUM	60	M	18/02/2019	19/03/2019	30	-	GOOD
11.	412	PANDIYAN	58	M	19/02/2019	20/03/2019	30	-	GOOD
12.	500	RAJASEKAR	34	M	26/02/2019	21/03/2019	24	6	MODERATE
13.	557	VELTHAI	48	F	04/03/2019	02/04/2019	30	-	GOOD
14.	614	TAMILSELVI	55	F	09/03/2019	07/04/2019	30	-	GOOD
15.	626	MADATHI	51	F	11/03/2019	10/04/2019	30	-	GOOD
16.	664	VAIKUNDATHAMMAL	60	F	11/03/2019	09/04/2019	30	-	MODERATE
17.	841	DURAIPANDI	53	M	01/04/2019	25/04/2019	25	5	GOOD
18.	894	KUMAR	48	M	08/04/2019	30/04/2019	23	7	GOOD
19.	997	RAMAMOORTHI	49	M	22/04/2019	02/06/2019	42	-	GOOD
20.	1149	GANESAN	42	M	06/05/2019	04/06/2019	30	-	GOOD

CASE SHEET OF 20 OUT PATIENTS TREATED FOR ERI GUNMAM

S.NO	OP.NO	NAME	AGE	SEX	STARTING OF TREATMENT	END OFTREATMENT	NO OF DAYS TREATED	RESULT
1.	31676	SIVA	30	M	05/04/2018	04/05/2018	30 DAYS	GOOD
2.	40162	NIVEDHA	20	F	25/04/2018	24/05/2018	30 DAYS	GOOD
3.	43290	JEYA CHANDRAN	33	M	16/05/2018	14/06/2018	30 DAYS	GOOD
4.	43671	GANESAN	48	M	17/05/2018	15/06/2018	30 DAYS	GOOD
5.	44600	GANESAN	43	M	21/05/2018	19/06/2018	30 DAYS	GOOD
6.	44882	GANESH RAJA	40	M	22/05/2018	20/06/2018	30 DAYS	GOOD
7.	56603	AATHIYAPPAN	45	M	06/07/2018	04/08/2018	30 DAYS	GOOD
8.	57663	ISMAYIL	42	M	10/07/2018	08/08/2018	30 DAYS	MODERATE
9.	61627	BABU LAKSHMANAN	48	M	24/07/2018	22/08/2018	30 DAYS	MODERATE
10.	63103	ESSAKI MUTHU	29	M	30/07/2018	28/08/2018	30 DAYS	GOOD
11.	102566	CHITHIRAI PANDI	28	M	11/12/2018	09/01/2019	30 DAYS	GOOD
12.	102876	SATHISH KUMAR	49	M	12/12/2018	10/01/2019	30 DAYS	GOOD
13.	103905	KRISHNA KUMAR	35	M	15/12/2018	13/01/2019	30 DAYS	GOOD
14.	931	SWARNAM	44	F	03/01/2019	01/02/2019	30 DAYS	GOOD
15.	3296	MAHESH	42	M	07/01/2019	05/01/2019	30 DAYS	GOOD
16.	4977	EPSHEEBA	23	F	11/01/2019	09/01/2019	30 DAYS	GOOD
17.	14546	MARIAPPAN	50	F	08/02/2019	09/03/2019	30 DAYS	GOOD
18.	15332	ANTONY RAJ	47	M	11/02/2019	12/03/2019	30 DAYS	MODERATE
19.	15507	SARASWATHI	50	F	11/02/2019	12/03/2019	30 DAYS	GOOD
20.	17397	SILUVAI THANGARAJ	45	M	16/02/2019	17/03/2019	30 DAYS	GOOD

LABORATORY INVESTIGATIONS (IP PATIENTS)

SI. NO	IP NO	HAEMATOLOGICAL REPORT												URINE ANALYSIS					
		BEFORE TREATMENT						AFTER TREATMENT						BEFORE TREATMENT			AFTER TREATMENT		
		TC cells/cu.mm	DC P %	DC L %	DC E %	ESR (1hr)	Hb gms %	TC cells/cu.mm	DC P %	DC L %	DC E %	ESR (1hr)	Hb gms %	Alb	Sug	Dep – Epi cells/ Pus cells	Alb	Sug	Dep – Epi cells/ Pus cells
1.	2015	6000	58	39	3	4	13.5	6500	59	39	2	4	11.1	NIL	NIL	NAD	NIL	NIL	NAD
2.	2049	7000	55	43	2	6	12.4	7100	57	40	3	7	12.9	NIL	NIL	NAD	NIL	NIL	NAD
3.	2541	8300	53	42	5	10	11.4	7500	59	39	2	9	12	NIL	NIL	NAD	NAD	NIL	NAD
4.	3022	7500	56	39	5	9	11.6	7600	57	40	3	7	11.9	NIL	NIL	NAD	NIL	NIL	NAD
5.	3065	9300	59	36	5	8	11.1	8800	60	35	5	6	11.0	NIL	NIL	NAD	NIL	NIL	NAD
6.	3101	7400	60	37	3	9	13.5	7300	62	33	5	12	11.8	NIL	NIL	NAD	NIL	NIL	NAD
7.	57	7400	58	40	2	10	12.0	7000	60	38	2	10	12.8	NIL	NIL	NAD	NAD	NIL	NIL
8.	94	7900	57	38	5	6	11.1	7500	64	33	3	11	9.5	NIL	NIL	NAD	NIL	NIL	NAD
9.	363	8500	63	33	4	9	11.4	8700	57	40	3	10	11.3	NIL	NIL	NAD	NIL	NIL	NAD
10.	400	7800	58	36	4	8	12.8	7900	58	40	2	6	13.2	NIL	NIL	NAD	NIL	NIL	NAD
11	412	7300	56	38	6	5	10.5	7400	55	41	4	4	11.8	NIL	NIL	2-3epi .cells	NIL	NIL	NAD
12.	500	7400	60	37	3	5	12.7	7700	63	35	2	19	12.6	NIL	NIL	Few pus cells	NIL	NIL	NAD
13.	557	7600	56	42	2	6	11	7800	60	38	2	6	11.7	NIL	NIL	NAD	NIL	NIL	NAD
14	614	7300	57	40	3	4	12.1	7300	60	36	4	5	13.0	NIL	NIL	NAD	NIL	NIL	NAD
15.	626	6000	58	40	2	5	13.8	6400	65	43	2	9	14.3	NIL	NIL	NAD	NIL	NIL	NAD
16.	664	8300	66	31	3	4	14.3	8200	64	34	2	7	13.9	NIL	NIL	Few pus cells	NIL	NIL	NAD
17.	841	8500	62	31	7	8	9.7	8300	61	35	4	6	10.6	NIL	NIL	NAD	NIL	NIL	NAD
18.	894	6800	60	36	4	5	10.9	6400	62	36	2	7	12.8	NIL	NIL	NAD	NIL	NIL	NAD
19.	997	8900	63	30	8	6	10.4	8600	59	38	3	5	11.4	NIL	NIL	NAD	NIL	NIL	NAD
20.	1149	7800	62	34	4	6	11.4	7600	67	26	2	4	11.2	NIL	NIL	1-2 puscells	NIL	NIL	NAD

LABORATORY INVESTIGATIONS (OP PATIENTS)

SI. NO	OP NO	HAEMATOLOGICAL REPORT												URINE ANALYSIS					
		BEFORE TREATMENT						AFTER TREATMENT						BEFORE TREATMENT			AFTER TREATMENT		
		TC cells/cu.mm	DC			ESR (1hr)	Hb gms %	TC cells/cu.mm	DC			ESR (1hr)	Hb gms %	Alb	Sug	Dep – Epi cells/ Pus cells	Alb	Sug	Dep – Epi cells/ Pus cells
			P %	L %	E %				P%	L%	E%								
1.	31676	6200	56	42	2	20	10.7	6500	50	46	4	15	11.1	NIL	NIL	NAD	NIL	NIL	NAD
2.	40162	7300	69	28	3	13	12.4	7100	67	30	2	8	12.9	NIL	NIL	NAD	NIL	NIL	NAD
3.	43290	8600	65	31	4	14	10.5	7500	69	28	3	10	10.9	NIL	NIL	NAD	NAD	NIL	NAD
4.	43671	7200	66	31	3	08	10.2	9600	71	27	2	07	11.9	NIL	NIL	NAD	NIL	NIL	NAD
5.	44600	7900	69	28	3	12	11.1	9500	72	25	5	11	12	NIL	NIL	NAD	NIL	NIL	NAD
6.	44882	7400	67	30	3	08	13.5	7300	70	23	5	10	13.8	NIL	NIL	NAD	NIL	NIL	NAD
7.	56603	8100	67	30	3	15	12.3	7300	60	38	2	08	12.8	NIL	NIL	1-2 pus cells	NAD	NIL	NAD
8.	57663	6400	55	41	4	32	12.4	6400	56	30	4	25	13	NIL	NIL	NAD	NIL	NIL	NAD
9.	61627	7500	66	31	3	10	11	8700	66	29	3	10	11.3	NIL	NIL	NAD	NIL	NIL	NAD
10.	63103	7700	59	35	6	11	12.8	7900	60	40	2	06	13.2	NIL	NIL	NAD	NIL	NIL	NAD
11.	102566	8300	66	32	2	09	10.5	7400	65	23	4	12	11.8	NIL	NIL	2-3 epi .cells	NIL	NIL	NAD
12.	102876	9200	68	30	2	13	12.7	9700	73	37	2	19	12.6	NIL	NIL	Few pus cells	NIL	NIL	NAD
13.	103905	7800	60	36	4	21	12	7800	61	31	2	17	13	NIL	NIL	NAD	NIL	NIL	NAD
14.	931	8300	67	30	3	17	12.1	7800	60	36	4	15	13.0	NIL	NIL	NAD	NIL	NIL	NAD
15.	3296	6000	55	42	3	15	12.9	6400	55	43	2	09	14.0	NIL	NIL	NAD	NIL	NIL	NAD
16.	4977	7600	66	32	2	10	12.3	8500	64	33	2	07	13	NIL	NIL	Few pus cells	NIL	NIL	NAD
17.	14546	7100	60	35	5	06	9.7	8300	60	35	4	07	10.3	NIL	NIL	NAD	NIL	NIL	NAD
18.	15332	6800	62	36	2	13	10.9	5400	67	24	3	08	12.8	NIL	NIL	NAD	NIL	NIL	NAD
19.	15507	7900	64	34	2	12	10.4	8600	59	27	3	13	11.4	NIL	NIL	NAD	NIL	NIL	NAD
20.	17397	6800	67	29	4	06	11.4	7600	67	26	2	06	11.2	NIL	NIL	1-2 puscells	NIL	NIL	NAD

LABORATORY INVESTIGATIONS (OP PATIENTS)

SI NO	OP NO	Before treatment				After treatment			
		Blood sugar(R)	Blood Urea	Serum cholestrol	Serum creatinine	Blood sugar(R)	Blood Urea	Serum cholesterol	Serum creatinine
1.	31676	110	20	200	0.5	112	22	190	0.4
2.	40162	90	25	182	0.6	102	23	170	0.5
3.	43290	112	26	220	0.8	108	24	180	0.5
4.	43671	100	25	169	0.6	118	27	142	0.6
5.	44600	108	26	202	0.5	115	28	190	0.6
6.	44882	120	27	167	0.9	120	25	160	0.8
7.	56603	115	27	186	0.7	118	23	170	0.5
8.	57663	102	28	195	0.7	114	27	190	0.8
9.	61627	105	24	180	0.5	109	25	160	0.7
10.	63103	95	26	145	0.8	108	24	150	0.7
11.	102566	130	24	187	0.8	120	24	196	0.8
12.	102876	115	28	180	0.9	107	26	168	0.8
13.	103905	113	26	167	0.7	120	25	156	0.6
14.	931	99	30	196	1.0	115	27	180	0.9
15.	3296	118	31	168	0.8	110	30	155	0.6
16.	4977	99	18	180	1.0	100	20	155	0.8
17.	14546	114	19	175	0.7	112	21	169	0.6
18.	15332	109	21	156	0.6	106	23	146	0.6
19.	15507	116	17	170	0.8	110	22	178	0.5
20.	17397	102	22	190	0.9	100	25	174	0.7

LABORATORY INVESTIGATIONS (IP PATIENTS)

SI NO	IP NO	Before treatment				After treatment			
		Blood sugar(R)	Blood Urea	Serum cholestrol	Serum creatinine	Blood sugar(R)	Blood Urea	Serum cholesterol	Serum creatinine
1.	2015	109	25	208	0.5	112	24	196	0.4
2.	2049	100	20	168	0.6	102	23	160	0.5
3.	2541	110	27	226	0.8	108	20	170	0.5
4.	3022	120	25	169	0.6	118	28	143	0.6
5.	3065	111	28	200	0.5	115	29	187	0.6
6.	3101	120	27	157	0.9	117	27	130	0.8
7.	57	109	27	169	0.7	102	24	161	0.5
8.	94	110	27	186	0.7	109	28	179	0.8
9.	363	120	24	187	0.5	103	25	156	0.7
10.	400	98	24	131	1.0	100	26	124	0.8
11.	412	120	26	187	0.9	113	24	196	1.0
12.	500	113	28	170	0.8	107	26	148	0.9
13.	557	104	26	167	0.5	120	25	156	0.7
14.	614	99	24	196	1.0	100	20	180	0.9
15.	626	118	32	168	0.8	120	34	155	0.6
16.	664	95	15	166	1.0	112	23	112	0.9
17.	841	110	16	171	0.6	108	21	120	0.5
18.	894	108	25	148	0.6	106	23	140	0.6
19.	997	119	18	167	0.7	115	22	178	0.5
20.	1149	102	20	201	0.8	99	26	160	0.7

BIBLIOGRAPHY

1. Agathiyar,Agathiyar Gunavagadam, Vidhyarathnaagara Achukoodam, 1928
2. Alagappan.R., Manual of Practical Medicine –4 th edition 2010
3. Anbarasu.K, Yugimuni Vaithiya Chinthamani,Thamarai, Noolagam, Chennai, 2nd edition July 2013/Page no.83.
4. Archana.V., et.al, Indian J. physiol.Pharmacol.,2000,44,3:350.
5. Bertti Aroet.al, Peptic Ulcer Disease in a general adult population; A Random population study/ American Journal of epideminology/vol 163/Issue II/ Jun 2006/pg no,1026.
6. Davidson ,Davidson's –Principle and practice of medicine 20 th edition
7. Evans WC. Pharmacology. Harcourt Brace and Company. Asia, Singapore. 1997;226.
8. Ferrero-Miliani.L et al,Chronic inflammation: importance of NOD2 and NALP3 in interleukin-1beta generation, Clin. Exp. Immunol. 147 (2) (2007) 227–235.
9. Goksel Sener-Muratoglu., et.al, Protective effect of famotidine, omeprazole and melatonin against acetylsalicylic acid induced gastic damage in rats.Digestive diseases and sciences. Feb 2001,Vol.46.No.2:318-330.
10. Harborne JB. Phytochemical methods, 11th ed. In Chapman &, Hall: New York; 1984. p. 4-5.
11. Harsh Mohan, Textbook of Pathology, Jaypee brothers, New Delhi/2005/pgno.563,565
12. Ka.Anbarasu/Yugimuni Vaithiya Chinthamani/ published by Thamarai Noolagam/Chennai/2nd edition July 2013/Page no.83.
13. Kandhasamy Mudaliar- Vaidhya saara sangiragam,1929
14. Kannusamy Pillai.C, Chikicha Rathina Theebam- - 8th edition
15. Kaseem Muhiytheen Rawoother, Pathartha Guna Chinthamani, rathina nayakkar & sons , 1932
16. Kuppusamy mudhaliyar.K.N.,Pothu Maruthuvam, Directorate of Indian Medicine & Homeopathy/2nd edition 2012/ page no.307.
17. MadanaGopalan.N et.al/Epidemiology of Peptic Ulcer Disease in India/Indian J Gastroenterology/Vol5
18. Murugesa Mudaliyar K.S. Gunapaadam –Mooligai vaguppu . Directorate of Indian Medicine and Homeopathy ,2002

19. Ponnaiya.I, pillai Pararasasegaram-.Revised edition-1990
20. Prema.S, M.D. (s) Ph.D Thereyar Gunavaagadam, Saraswathi mahal, Tanjore Tamil University.
21. Pullaiah.T.,Medicinal Plants of India–Vol I, page no.234
22. Rajamani Saranya et al.,Asian Pac J Trop Biomed 2013; 3(1): 79-84
23. Ramachandiran.S.P Agathiyar Ayulvedham 1200-, Reprint-1999
24. Ramachandiran.S.P Thirumoolar Karukkadai Vaidhyam -600-,Reprint 1998
25. Ramachandran.S.P Athma Rakshamirtham-, 1 st edition 2000
26. Ramachandran.S.P, Agathiyar Kanma Kandam- 1 st editon 1995
27. Ramachandran.S.P,Agathiyar vaidhya kaviyam 1500 –2 nd edition -2001
28. Sabapathy mudhaliyar.,Jeeva Rakshamirtham,
29. Samabasivampillai.T.V Tamil –English Dictionary, Directorate of Indian Medicnes Homeopathy, Chennai, 1995
30. Seetharam.J, Anubava vaidhya Deva Ragasiyam –1 st edition -1999
31. Shah Ayub, M.A.,et.al,. Subacute toxicity studies on Pendimethalin in rats. Indian J. Pharm. 29: 1997, 322-324.
32. Shanmugavelu.M, Noinadal Noimuthal Naadal, Directorate of Indian Medicine and Homeopathy, Chennai, Vol.I, fifth edition/2009, Page no.361
33. Shanmugavelu.N , Noinadal Noi Muthal Naadal, Directorate of Indian Medicnes Homeopathy, Chennai, Vol.I, 5 th edition, 2009, Page no.173,183
34. Shetty Akhila. J.,et.al, Alwar, M.C., Acute toxicity studies and determination of median lethal dose Current science 2007.,Page 937, 917.
35. Thiyagarajan.L ,L.I.M, Sirappu Maruthuvam , Directorate of Indian Medicnes Homeopathy, Chennai, second edition 1995
36. Uthamarayan.K.S , H.P.I.M .,Siddha Maruthuvaanga Churukkam, Directorate of Indian Medicnes Homeopathy, Chennai,
37. Venugopal.P.M, H.P.I.M. Udal Thathuvam Directorate of Indian Medicnes Homeopathy, Chennai,1993

ANNEXURE-I

PREPARATION OF TRIAL MEDICINE

வெள்ளருகு சூரணம்

(Reference: Gunapadam Mooligai Part-I Page No.843)

Tamil Name	**Botanical Name (Family)**	**Phytochemicals**	**Action**	**Therapeutic uses**
Vellarugu	*Enicostemma axillare Gentianaeceae*	Alkaloids, Carbohydrates, Glycosides, Flavonoids, Tannins, PhytoSterols. Proteins, Lignin, Saponins.	Anti-ulcer, Anti-spasmodic, Anti-inflammatory, Anti microbial, Anti oxidant, Analgesic.	Gunmam

PURIFICATION OF DRUG:

The ingredient of the herbal formulation was purified as below according to the proper procedure methods described in Siddha classical literature.

Vellarugu-The whole plant was cleaned, washed in water & dried.

METHOD OF PREPARATION:

Then the whole plant was dried in the shade until complete evaporation of the moisture content. It was made fine powder and kept in an air tight container. Then the Chooranam was purified by steam boiling process according to the Siddha classical text. It was labelled as *Vellarugu Chooranam* (VC).

DISPENSING:

In Outpatient department, 8g of 2 packets (each packets contains – 4g) chooranam was given for two days to a patient.

In Inpatient department 4g of a packet chooranam was given daily.

வெள்ளருகு:

சுவை : கைப்பு

தன்மை: வெப்பம்

பிரிவு : கார்ப்பு

பொதுக்குணம்:

குன்மமோடு வாய்வு குடல்வாதம் சூலையிவை
சென்மம்விட் டோடிச்சிதையுங்காண் வன்முலையாய்
உள்ளுறுகி ரந்திசொறி யொட்டிய சிரங்குமறும்
வெள்ளருகு தன்னை விரும்பு.

வெள்ளருகு சமூலத்தை முறைப்படி சூரணம் செய்து இருவேளை கொடுத்து வர குன்மம் தீரும்.

ANNEXURE - II

GOVERNMENT SIDDHA MEDICAL COLLEGE & HOSPITAL,

PALAYAMKOTTAI - 2.

Department of Pothu Maruthuvam

A prospective open labelled non randomized phase II clinical trial to assess the therapeutic efficacy of the Siddha formulation *Vellarugu chooranam* for the treatment of *Erigunmam* (Peptic Ulcer Disease)

CLINICAL ASSESSMENT DURING AND AFTER TRIAL

Clinical Assessment Score:

1. Burning sensation in upper abdomen (*Siru vayittril erichal*)
2. Nausea (*Kudal kumattal*)
3. Water brash (*Vayil neer ooral*)
4. Headache (*Thalaivali*)
5. Flatulence (*Vayiruppal, Eraichal*)
6. Dizziness (*Kirukiruppu*)
7. Excessive sweating (*Mayirkalil viyarvai peruguthal*)
8. Loss of body weight *(Udal ilaithal)*
9. Loss of appetite *(Pasiyinmai)*
10. Neuritic pain *(Udal erichal)*
11. Cough *(Irumal)*

$$\textbf{Clinical Assessment Score} = \frac{\textbf{Number of present symptoms}}{\textbf{Total number of symptoms}} \times 100$$

Grade 0 = 0 – 5 Grade I = 6 – 10 Grade II – 11 - 40 Grade III 41 – 70 Grade IV Above ≤ 70

Visit 1/ date : _____Score _____Grade _____

Visit 2/ date : _____Score _____Grade _____

Visit 3/ date : _____Score _____Grade _____

Visit 4/ date : _____Score _____Grade _____

Visit 5/ date : _____Score _____Grade _____

_____ _____

Signature of the Guide Signature of the Investigator

_____

Signature of the HOD

GOVT.SIDDHA MEDICAL COLLEGE
PALAYAMKOTTAI

SCREENING COMMITTEE

Name of the candidate : Dr.M.Muthumari

Registration No: .....

DEPARTMENT OF POTHU MARUTHUVAM

This is to certify that the dissertation topic A Prospective open labeled Non Randomized phase-II clinical trial on herbal drug **"VELLARUGU CHOORANAM"** for the treatment of **ERI GUNMAM** (Peptic Ulcer Disease) has been approved by the screening committee.

Branch	Department	Name	Signature
I	Pothu Maruthuvam	Prof.Dr.A.Manoharan MD(S)	
II	Gunapadam	Dr.A.Kingsly MD(S) (Associate Professor)	
III	Sirappu Maruthuvam	Prof.Dr.A.S.Poongodi Kanthimathi MD(S)	
IV	Kuzhanthai Maruthuvam	Prof.Dr.D.K.Soundararajan MD(S)	
V	Noi Nadal	Prof.Dr.S.Victoria MD(S)	for M. Krishnan 26/5/17
VI	Nanju nool Maruthuvam	Prof.Dr.M.Thiruthani MD(S) For	

Place : Palayamkottai

Date : 26.05.2017

PRINCIPAL
Govt. Siddha Medical College
Palayamkottai

INSTITUTIONAL ETHICAL COMMITTEE,
GOVERNMENT SIDDHA MEDICAL COLLEGE,
PALAYAMKOTTAI, TIRUNELVELI- 627002,
TAMIL NADU, INDIA.

Ph: 0462-2572736/2572737/2582010 Fax: 0462-2582010
Email ID: gsmc.palayamkottai@gmail.com **Date: 29.05.2017**

R.No.GSMC/5676/P&D/Res/IEC/2014

CERTIFICATE OF APPROVAL

Address of Ethical Committee	Government Siddha Medical College, Palayamkottai, Tirunelveli(627002) district.
Principal Investigator	Dr. M .MUTHUMARI ,MD(s) First year, Department of Pothu Maruthuvam, Reg. No: Not yet registered.
Supervisor	**Prof.Dr.A.MANOHARAN, M.D(s).,** Head of the Department, Department of Pothu Maruthuvam, Government Siddha Medical College and Hospital, Palayamkottai - 627002, Tirunelveli District. drmanoharan25@gmail.com
Guide	**Dr. T. KOMALAVALLI, MD(S),Ph.D,** Asso. Professor, Department of Pothu Maruthuvam Government Siddha Medical College and Hospital, Palayamkottai - 627002, Tirunelveli District
Dissertation Topic	A prospective open labeled non randomized phase II clinical trial to assess the therapeutic efficacy of the Siddha formulation Vellaruguchooranam for the treatment of Erigunmam (Peptic Ulcer Disease)
Documents Filed	(1)Protocol (2)Data Collection Forms (3)Patient Information Sheet (4)Consent Form (5)SAE (Pharmacovigilance)
Clinical/Non Clinical Trial Protocol (Others-Specify)	Clinical Trial Protocol-yes
Informed Consent Document	Yes
Any other Document	Case Sheet/Investigation Documents
Date of IEC Approval & its Number	29.05.2017, GSMC-IV-IEC/2017/Br-I-05/29.05.2017

We approve the trial to be conducted in its presented form.

The Institutional Ethical Committee expects to be informed about the process report to be submitted to the IEC at least annually of the study, any SAE occurring in the course of the study, any changes in the protocol and submission of final report.

Chairman Member Secretary

29/5/17

(Prof. Dr.Murugesan M.D(s).,) **(Prof.Dr.R.NeelavathyMD(s)Ph.D.,)**

GOVERNMENT SIDDHA MEDICAL COLLEGE
PALAYAMKOTTAI

Certificate of Botanical Authenticity

Certified the following plant drug used in Siddha formulation (Internal) **"VELLARUGU CHOORANAM"** for **"ERI GUNMAM"** (Peptic Ulcer Disease) taken up for Post-Graduation Dissertation Studies by Dr.M. MUTHU MARI, PG Scholar MD siddha, Department of Pothu Maruthuvam, is correctly identified and authenticated through Visual inspection / Organoleptic Characters / Experience, Education & Training Morphology Microscopically and Taxonomical methods.

Table 1: Ingredients of Vellarugu Chooranam

S.N	Drug	Botanical Name	Family	Parts Used
01	Vellarugu	*Enicostemma axillarae*	Gentianaceae	Whole Plant

Station: Palayamkottai

Date : 16.2.18.

Authorized Signature 16/2/18.

Dr. S. SUTHA, M.Sc.,M.Ed.,Ph.D.,
Associate Professor
Dept. of Medicinal Botany
Govt. Siddha Medical College
Palayamkottai, Tirunelveli - 2.

GOVT. SIDDHA MEDICAL COLLEGE

DEPT. OF MEDICINAL BOTANY

PALAYAMKOTTAI.

Medicinal Flora of Tamilnadu 2016 - 2017

Botanical Name	:	Enicostemma axillare
Family	:	Gentianaceae
Vern.Name	:	Vellarugu
Locality	:	Palayamkottai
Altitude	:	
Part Used	:	Whole Plant
Medicinal Uses	:	Gunmam.

Collected by : Dr. M. MUTHUMARI. M.D(S)

Certified and authenticated by
16/2/18
Dr. S. SUTHA.
Dept of Medicinal Botany
Govt Siddha

Clinical Trial Details (PDF Generation Date :- Tue, 09 Jul 2019 03:29:20 GMT)

CTRI Number	CTRI/2018/04/012924 [Registered on: 02/04/2018] - **Trial Registered Prospectively**
Last Modified On	27/03/2018
Post Graduate Thesis	Yes
Type of Trial	Interventional
Type of Study	Siddha
Study Design	Other
Public Title of Study	To study the effect of drug VELLARUGU CHOORANAM on Gunman (peptic ulcer)
Scientific Title of Study	A prospective open labeled non randomized phase II clinical trial to assess therapeutic efficacy of the Siddha formulation Vellarugu chooranam for the treatment of Erigunmam (Peptic Ulcer Disease)

Secondary IDs if Any

Secondary ID	Identifier
NIL	NIL

Details of Principal Investigator or overall Trial Coordinator (multi-center study)

Details of Principal Investigator	
Name	M MUTHUMARI
Designation	PG Student
Affiliation	Government siddha medical college and hospital
Address	Op number 10 PG Dept of Pothu Maruthuvam Government siddha medical college and hospital Palayamkottai Tirunelveli TAMIL NADU 627002 India
Phone	8220606063
Fax	
Email	dr.muthumari23@gmail.com

Details Contact Person (Scientific Query)

Details Contact Person (Scientific Query)	
Name	Dr T KOMALAVALLI MD siddha PhD
Designation	Associate Professor
Affiliation	Government siddha medical college and hospital
Address	Department of Pothu maruthuvam Government siddha medical college and hospital palayamkottai Tirunelveli TAMIL NADU 627002 India
Phone	9788122691
Fax	
Email	komalaarumugam1@gmail.com

Details Contact Person (Public Query)

Details Contact Person (Public Query)	
Name	Dr T KOMALAVALLI MD siddha PhD
Designation	Associate Professor
Affiliation	Government siddha medical college and hospital
Address	Department of Pothu maruthuvam Government siddha medical college and hospital Palayamkottai Tirunelveli TAMIL NADU 627002 India
Phone	9788122691

K.M. COLLEGE OF PHARMACY – MADURAI

IAEC – CERTIFICATE

This is to certificate that the project title A PROSPECTIVE OPEN LABELED NON-RANDOMIZED PHASE II CLINICAL TRIAL TO ASSESS THE THERAPEUTIC EFFICACY OF THE SIDDHA FORMULATION **VELLARUGUCHOORANAM** FOR THE TREATMENT OF ERIGUNMAM (PEPTIC ULCER DISEASE) has been approved by the **IAEC/ M. MUTHUMARI /TNMGRMU/MD(S)/321611005/KMCP/27/2018.**

Dr. N. CHIDAMBARANATHAN

Name of the Chairman / Member Secretary IAEC:

Dr. P. THIRUPATHY KUMARESAN.

Name of the CPCSEA Nominee

N. Chidambaranathan 1/5/17

Signature with Date

I. A. E. C. CHAIRMAN
INSTITUTIONAL ANIMAL ETHICAL COMMITTEE
K. M. COLLEGE OF PHARMACY
MADURAI-625 107.

CPCSEA NOMINEE
INSTITUTIONAL ANIMAL ETHICS COMMITTEE
K M. COLLEGE OF PHARMACY
MADURAI-625 107

Chairman / Member Secretary of IAEC

CPCSEA Nominee

(Kindly make sure that minutes of the meeting duly signed by all the participants are maintained by office).

The Tamil Nadu Dr. M.G.R. Medical University

69, Anna Salai, Guindy, Chennai - 600 032.

This certificate is awarded to Dr/~~Mr/Mrs~~.....M.MUTHUMARI.....

for participating as ~~Resource Person~~ / Delegate in the XXIII Workshop on

"RESEARCH METHODOLOGY & BIOSTATISTICS"

Organized by the Department of Siddha,

The Tamil Nadu Dr. M.G.R. Medical University from 6th to 10th March 2017.

Dr. N. KABILAN, M.D.(Siddha)
PROF & HEAD
Dept of Siddha

Dr. T.BALASUBRAMANIAN M.S.,D.L.O.,
REGISTRAR

Prof. Dr. S.GEETHALAKSHMI, M.D.,Ph.D.,
VICE CHANCELLOR

GOVERNMENT SIDDHA MEDICAL COLLEGE& HOSPITAL
PALAYAMKOTTAI

CME PROGRAMME

Conducted by
SIRAPPU MARUTHUVAM DEPARTMENT GSMCH - PALAYAMKOTTAI

Organised by
ASHTAVAIDYAN THAIKKATTU MOOSS
VAIDYARATNAM

Supported by
PG Student Council
Govt. Siddha Medical College, Palayamkottai

S.No: 137

CERTIFICATE

This Certifies that

Dr. M. Muthumani

has participated in Continuing Medical Education on "**AYUSH External Therapies-II**" held at GSMCH, Palayamkottai on Dec, 4 2018

Dr. A.S.Poongodi Kanthimathi MD (s).,
Head - Dept. of Sirappu Maruthuvam

Authorised Signatory
VAIDYARATNAM

Dr. R. Neelavathy MD (s), Ph.D.,
Principal

GOVERNMENT SIDDHA MEDICAL COLLEGE

PALAYAMKOTTAI, TIRUNELVELI – 627 002

CONTINUING MEDICAL EDUCATION PROGRAMME

Conducted by

Post Graduate Department of Pothu Maruthuvam

This certificate is awarded to Dr / ~~Mr~~ / ~~Mrs~~ MUTHUMARI. M.

has participated in the CME Programme held on 05.12.2018 at Conference Hall, Special Therapy Wing, Government Siddha Medical College, Palayamkottai, Tirunelveli. This programme is focused on "HIV / AIDS"

Prof .Dr.A.MANOHARAN , M.D (s) , (Ph.D)
Head , Department of PothuMaruthuvam
Government Siddha Medical College,
Palayamkottai

Prof . Dr. R. NEELAVATHI, M.D(s)., Ph.D.,
Principal
Government Siddha Medical College
Palayamkottai

Journal of Research in Biomedical Sciences

Peer reviewed Open Access Internationally Indexed Journal

ISSN 9582-3343

CERTIFICATE OF PUBLICATION

This certificate is hereby bestowed upon

Muthumari M

For publishing Journal article entitled

Acute and Sub Acute Toxicity studies of Vellarugu chooranam (Enicostemma axillare, Lam.) in Albino Rat

in Volume 2 Issue 1 , 2019 (Jan-Mar) www.biosci.in/jrbms

Society for Scholarly Publishing

Dr. Jey Rituz

Editor in Chief

Journal of Research in Biomedical Sciences (JRBMS)
A Peer reviewed Indexed Journal ISSN 9522-3343

https://doi.org/10.11.325/jrbms

RESEARCH ARTICLE

Acute and Sub Acute Toxicity studies of Vellarugu *chooranam* (*Enicostemma axillare, Lam.*) *in Albino Rat*

Muthumari[*1] *M, Manoharan*[2] *A, Komalavalli*[3] *T.*

[1]PG Scholar, [2]Professor & Head of the Department, [3]Associate Professor, Department of *Pothu Maruthuvam*, GSMC, Palayamkottai, Tamilnadu, India.

Corresponding Author : *Muthumari,* [1]PG Scholar, Department of *Pothu Maruthuvam*, GSMC, Palayamkottai, Tamilnadu, India.

Received : 01/01.2019
Revised : 10/03/2019
Accepted :24/03/2019

Abstract

Background: The Vellarugu Chooranam (*Enicostemma axillare* (Lam.) is an important drug in siddha system, which is coming under Gentianaceae family. The whole plant contains, the presence of phenols, tannins, flavonoids, glycosides, anthraquinones and sterols (Adeneye, A.A., et al S.O., 2006).The present study focus on Siddha herbal preparation. Vellarugu chooranam(VAC) is mentioned in the ancient siddha books and literature. Above books described Vatha, Pitha diseases and uses of VAC. Mostly VAC used in some skin disease, gynaec disease and Acid peptic disease. **Objectives:** The objective of the present study to evaluate the acute and Sub acute toxicity study of Vellarugu chooranam. **Materials and Methods:** A toxicity study was carried out according to OECD -423 guidelines. The study material (VAC) was collected from Tirunelveli district, purified VAC was fed 2000 mg /kg/bw to overnight fasted rat. The animals were observed daily for toxicity signs/mortality. After animals were sacrificed and gross pathological changes were recorded. Subacute toxicity of rat studied by feted by 50mg/kg/bw upto 400mg/kg/bw. Hematological and biochemical parametres of treated rat were compared to the corresponding group I control animals. **Results:** No acute and subacute toxicity were observed in any other group of animals, at the maximum recomputed dose level of 2gm/kg/bw. VAC was not produced liver and other organ damage; it was confirmed by histopathological examination. **Conclusion:** These results exhibit the absence of acute and subacute toxicity after treatment of Vellarugu chooranam (VAC) in treated animals. So, all the results was revealed VAC is safer and high therapeutic uses in long term uses.

Keywords:

Toxicity study, Animal studies, medicinal plant

INTRODUCTION

Native medicines are used throughout the world. The drug products from raw materials for the pharmaceutical industry represent a substantial proportion of the global drug market [Abu TahaNael, et al., 2008]. The practices continue today because of its biomedical benefits as well as a place in cultural beliefs in many parts of the world and have made a great contribution towards maintaining human health. Approximately 80% of the population use herbal medicines to treat medical illness.

International Journal of Modern Pharmaceutical Research (IJMPR)

SJIF Impact Factor: 3.498

Date: 26/06/2019

CERTIFICATE FROM EDITOR

It is hereby certified that Article entitled **"ANTI-INFLAMMATORY AND ANALGESIC ACTIVITIES OF VELLARUGU CHOORANAM (ENICOSTEMMA AXILLARE LINN.) IN ALBINO RAT MODELS"** Manuscript no. IJMPR/225/3/2019, Author name: **Dr. Muthumari M.***, received for publication in *International Journal of Modern Pharmaceutical Research*(IJMPR), (ISSN No: 2319-5878) and has been published (Volume 3, Issue 3) after getting reviewed by three reviewers.

IJPMR is **Indexed in** Google Scholar, Index Copernicus, Socolar, China, Research Bible, Fuchu, Tokyo. Japan, Cosmos Impact Factor, Scientific Indexing Services (SIS), IP Indexing (Under Process), Scientific Journal Impact Factor **(SJIF 3.498).**

Editor in chief

Society for Advance Healthcare Research

IJMPR

IJMPR 2019, 3(3), 37-41

International Journal of Modern Pharmaceutical Research
www.ijmpronline.com

ISSN: 2319-5878
IJMPR
Research Article
SJIF Impact Factor: 3.498

ANTI-INFLAMMATORY AND ANALGESIC ACTIVITIES OF *VELLARUGU CHOORANAM (ENICOSTEMMA AXILLARE LINN.)* IN ALBINO RAT MODELS

Dr. Muthumari M.*[1] and Manoharan A.[2]

[1]PG Scholar, Department of Pothu Maruthuvam, GSMC, Palayamkottai, Tamilnadu, India.
[2]Professor & Head of the Department, Department of Pothu Maruthuvam, GSMC, Palayamkottai, Tamilnadu, India.

Received on: 20/04/2019
Revised on: 10/05/2019
Accepted on: 30/05/2019

***Corresponding Author**
Dr. Muthumari M.
PG Scholar, Department of Pothu Maruthuvam, GSMC, Palayamkottai, Tamilnadu, India.

ABSTRACT

The Vellarugu Chooranam (VC) (*Enicostemma axillare* (Lam.) is one of the important drug in Siddha system, because it was used various formed in the system. The aim of the study was to evaluate the analgesic and anti-inflammatory activities of *Vellarugu chooranam (Enicostemma axillare Linn*) in male albino rat models (180 ± 5 g). The analgesic activity of *Vellarugu chooranam* was assessed by acetic-acid writhing test. The Anti-inflammatory effect was analyzed by carrageenan induced paw edema and pleurisy induced methods. The analysis of experimental data was performed by statistical process of ANOVA to determine the variability of sample, while Newman-Keul's multiple range was performed for evaluation of comparative analgesic and anti-inflammatory activity of *Vellarugu chooranam* with control and standard. The writhing test showed a significant increase in the mean reaction time to stimuli in both 100 mg/kg and 200 mg/kg BW doses throughout the observation period in 30 minutes after treatment, which was comparable to the standard ***Diclofenac sodium*** and control group. In analgesic and anti-inflammatory studies showed, the inhibition of pain percentage and inflammation was noted. This result was Comparing with control and treatment groups. The results was 1.22 ±0.14, 1.42±0.19 and percentage in paw values is 65.73%, 60.11% respectively. The carragenan induced pleurisy in rat models showed decrease in pleural exudates and Leukocytes count was 0.24±0.13, 0.20±0.11 and 0.008±0.12, 0.50%±0.09% respectively.

KEYWORDS: Anti-inflammatory, Analgesic, *Vellarugu chooranam,* carragenn induced pleurisy.

INTRODUCTION

Inflammation is a complex biological response of vascular tissues against aggressive agents such as pathogens, irritants or damaged cells. Acute inflammation is the initial response and is characterized by the increased movement of plasma and innate immune system cells, such as neutrophils and macrophages from the blood into the injured tissues. The standard signs of inflammation are expressed by increased blood flow, elevated cellular metabolism, vasodilatation, release of soluble mediators, extravasation of fluids and cellular influx [Ferrero-Miliani et al.2007]. Upon the presence of the inflammatory agent, cell membranes induce the activation of phospholipase A2 followed by release of arachidonic acid and inflammatory mediators such as cytokines, serotonin, histamine, prostaglandin and leukotrienes that increase vascular permeability, thus facilitating the migration of leukocytes to the site of inflammation [Dassoler et al 2004]. Inflammation induced by carrageenan is acute, nonimmune, well-researched, and highly reproducible. Cardinal signs of inflammation—oedema, hyperanalgesia, and erythema—develop immediately following cutaneous injection, resulting from action of pro-inflammatory agents—bradykinin, histamine, tachykinins, complement and reactive oxygen, and nitrogen species. Many saponins tested have displayed significant antinociceptive, anti-inflammatory and antipyretic activities possibly due to their nonglycosidic moiety, the sapogenin, but also many diverse activities have also been reported such as anti-allergic, antifungal,analgesic and others [Hostettmann et al .2005 ,Tomlinson et al 2004.and Francis et al 2002]. Moreover a variety of siddha formulation preparation have been proved to be useful in animal models of inflammation [De La Lastra et al.2005. Song et al.2012and, Kang et al 2005].

Paw swelling or footpad edema is a convenient method for assessing inflammatory responses to antigenic challenges and irritants. Typically, test compounds are assessed for acute anti-inflammatory activity by examining their ability to reduce or prevent the development of carrageenan-induced paw swelling. In the present study attempts are made to validate the claims of Vellarugu chooranam regarding the anti-inflammatory activities of this Siddha preparation.

URKUND

Urkund Analysis Result

Analysed Document:	Muthumari.docx (D54399063)
Submitted:	7/12/2019 10:51:00 AM
Submitted By:	jeromstat@gmail.com
Significance:	10 %

Sources included in the report:

http://repository-tnmgrmu.ac.in/6964/1/320101413namasivayam.pdf
http://repository-tnmgrmu.ac.in/10213/1/320101418jensin_brintha.pdf
http://repository-tnmgrmu.ac.in/10389/1/320501407haja_mohideen.pdf
http://repository-tnmgrmu.ac.in/9632/1/320101517kalpana.pdf
http://repository-tnmgrmu.ac.in/10214/1/320101418nahitha_lubana.pdf
7e960868-f1b1-4a07-aa39-20ac53f0d697
5322844f-9aa8-41c1-bcc4-1e785adc5aa8
dc409654-8b5f-441a-bc85-8ec0871bd701

Instances where selected sources appear:

53